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NO WRAPPER—NO ADDRESS.
A. S. BURLESON,
Postmaster General.

TELEPHONE ENGINEER

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The major problems and difficulties that beset telephone operation today center chiefly about that factor which the Automatic system eliminates,—the switchboard operator.

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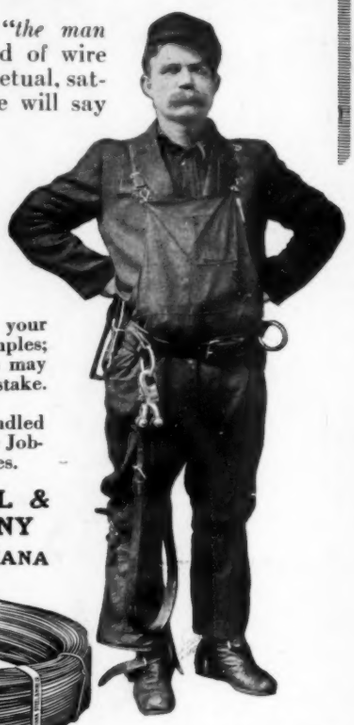

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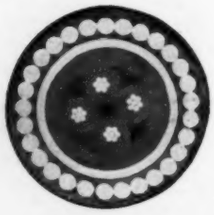

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If Your News Dealer Will Not Supply You—Please Notify Us

VOL. XX CHICAGO, OCTOBER, 1918 NO. 4

By Woodrow Wilson, President of the United States

AGAIN the Government comes to the people of the country with the request that they lend their money, and lend it upon a more liberal scale than ever before, in order that the great war for the rights of America and the liberation of the world may be prosecuted with ever increasing vigor to a victorious conclusion. And it makes the appeal with the greatest confidence because it knows that every day it is becoming clearer and clearer to thinking men throughout the nation that the winning of the war is an essential investment. The money that is held back now will be of little use or value if the war is not won and the selfish masters of Germany are permitted to dictate what America may and may not do. Men in America, besides, have from the first until now dedicated both their lives and their fortunes to the vindication and maintenance of the great principles and objects for which our Government was set up. They will not fail now to show the world for what their wealth was intended.

Installation and Moving Charges

UNQUESTIONABLY the important event of the month's record of government wire control was Postmaster General Burleson's order establishing certain standard charges for installing and moving telephones. It is the first pressure of government influence upon the general rate schedule.

The several state utility commissioners who have opposed or questioned the official order based their argument on the alleged exorbitance of the rates named. It seems to be a fact that no operating company heretofore has claimed so large a charge for the functions named in the order.

The Ohio, Nebraska, Minnesota and Montana commissions, and probably some others, are distressed because the new charge threatens to discourage telephone installation and reduce the facilities of the state. But that, if we mistake not, is the very aim and purpose of the Postmaster General: To eliminate the undesirable and nonessential telephone connections to the end of better service for those whose necessity makes the payment of a special charge an insignificant detail. It is, in other words, a tax rather than a rate.

We suspect that a good deal of the state commission opposition to the federal charge is based on regard for the principle of state rights. The installation and moving charge is in no sense interstate business; it is local to the last degree. Intrusion of national authority upon state jurisdiction has led to many a dispute. Even the exigencies of war do not, in state-rule eyes, excuse such intrusion when the national advantage is not directly apparent. Commission Chairman Marshall and Attorney General McGhee of Ohio contend installation fees are a police regulation which the federal telephone bill specifically reserves to the various states. They say the federal government may have the right to demand installation charges, but states may say whether they are reasonable or excessive.

There is a good deal to be said against the figures named in Order No. 1931 and Bulletin No. 8. The only thing to be said for them is that their evident intention is to aid in carrying on the work of conservation and of collecting revenue for war. If that reason be sound, it is enough.

It is obvious that as a government order the new charges must go into effect. Where state authorities dispute the arrangement, there can be no objection to the plan of holding such revenues in escrow until all jurisdictions are satisfied.

Propaganda for Permanent Ownership

THE Hearst papers, whose editors knew all about the inevitability of government wire control long before Congress had even considered it, are giving space to the propaganda of the Public Ownership League of America. Hon. Albert M. Todd of Kalamazoo, Mich., is the president. Carl D. Thompson is secretary and is in charge of the national office of the league in Chicago. The treasurer is Charles H. Ingersoll of the Ingersoll Watch Company. Among the officers and committeemen are such well-known figures as Frank P. Walsh, joint chairman of the war labor board; Amos Pinchot of New York, Professor Charles Zueblin of Boston, Miss Jane Addams, Hull House, Chicago; Hon. Edward F. Dunne, former governor of Illinois; Delos F. Wilcox, public utility expert; Louis F. Post, of the Department of Labor; Senator Robert L. Owen of Oklahoma; Frank Hayes, president United Mine Workers of America; Frederic C. Howe, commissioner of immigration, and David J. Lewis, of the Postmaster General's telephone control staff.

The general object of the league is "to advance the public ownership, efficient management and democratic control of public utilities and natural resources. Its immediate purpose is to bring together upon a broad nonpartisan basis all the various elements that believe in public ownership; to federate and co-ordinate these forces in order that their efforts may be made more effective and cumulative." To this end the Chicago office is undertaking to develop a press service and to print and distribute bulletins, leaflets and books. "There are also," it announces, "the technical and engineering as well as the legislative and legal phases of the problem that have to be worked out."

We expect to see a great deal of this sort of activity between now and the winning of the war. However radical and bolshevistic it may appear to a conservative mind, it is not unimportant. As an organized effort it will have its degree of weight; and cleverly wrought propaganda can be made to exert a great deal of influence upon the hitherto unmolded lay mind.

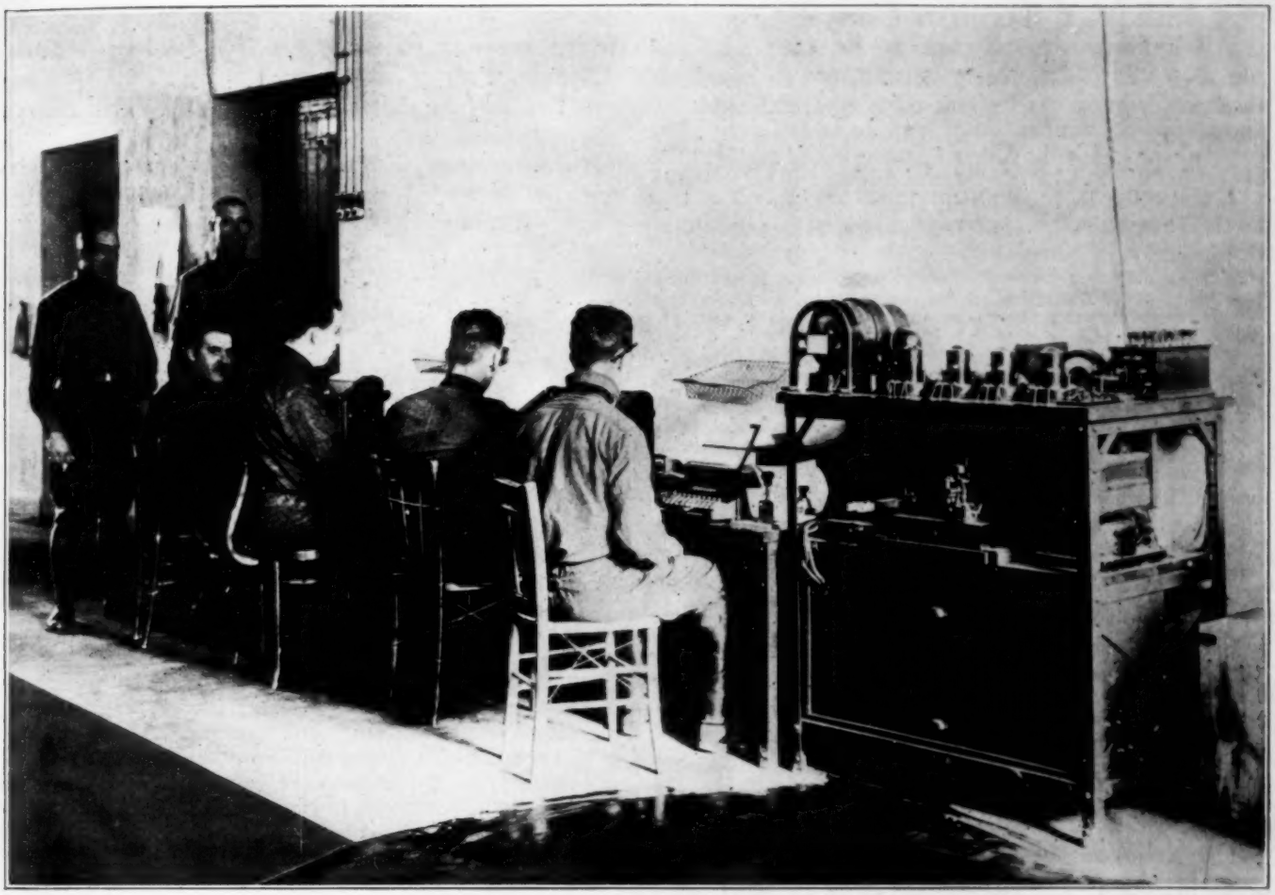
There is nothing reprehensible in the support of public ownership, provided its proponents are sincere and use only truth in their campaigning. Most of them are sincere, but according to our belief mistaken. We believe the success of their cause would be costly to people and government—a distinctly retrograde step. The possibility that public ownership of telephones would place us telephonically on a par with the other facility-owning nations is enough to condemn the project. The facts are the best possible argument for private ownership and operation.

Not a few telephone operators already are saying that they never expect to get their plants back. As a bit of human philosophy that remark may ring like wisdom; but it is not a good business statement. The provision of Congress and of the President is for such return. It is not necessary that operators go out of their way to predict future adverse legislation, even though they keep a cheerful face about it.

Every telephone man who believes as he should in the efficiency and the wisdom of private ownership wants his business back at the end of the war. With that thought properly in his mind he will need to devote some attention to the activities of those who hold the opposite thought.

There is not the slightest evidence that the people favor permanent public ownership, the Hearst editors to the contrary notwithstanding. There is a chance that more and more of the people may favor it if its propaganda be not met with propaganda.

This is a matter for telephone associations to consider, since individual operators can do nothing.



American Telegraph Printer Installation in France.

All the Modern Methods of Wire Communication, as Well as Wireless, Are Used by the Mammoth Military Industry Built Up Overseas by the American Expeditionary Forces.

American Telephone Pole Line Paralleling French Construction.

Where American Wires Are Given a Special Right of Way.

A Corner Pole Somewhere in France Erected by Americans.

Some of the Construction Work that Almost Makes the Boys from American Telephone Companies Think They Are Home.

STORIES IN PICTURES OF THE WORK BEHIND THE LINES ACCOMPLISHED BY THE UNITED STATES SIGNAL CORPS.

Indiana's Twelfth Convention

The spirit which dominated at the twelfth annual convention of the Indiana Independent Telephone Association, which was held at the Claypool Hotel, Indianapolis, September 11, 12 and 13, was in complete co-operation with the United States government in its operation of telephone systems under federal control. This spirit was embodied in the resolution presented by Thomas E. Ellison, of La Grange, chairman of the resolutions committee:

It is the earnest, patriotic thought and design of this association to do everything within its power to help win the war. We do, therefore, most earnestly and enthusiastically offer our full and complete co-operation with the United States government in the conduct and operation of the telephone systems of this state to that end.

The convention was of more than ordinary importance because of the fact that the United States government has assumed control of the telephone systems and a more complete centralization of the systems is being proposed in Indiana.

The following officers were elected: President, Samuel Tomlinson of Plymouth, president of the Winona Telephone Company, to succeed Frank E. Bohn, of Fort Wayne; first vice-president, S. M. Isom of Mitchell; second vice-president, W. L. Bott, of Rensselaer; secretary-treasurer, M. F. Hosea of Indianapolis. These officers with the following men constitute the board of directors: H. F. Farwell, of Terre Haute; Frank E. Bohn, of Fort Wayne; Walter J. Uhl, of Logansport; W. W. Harbaugh, of Sullivan; F. R. Parrett, of Princeton; F. O. Cuppy, of Lafayette; William Fortune, of Indianapolis; F. R. Strickler, of Franklin; J. A. Browne, of Winchester; W. M. Bailey, of Richmond, and C. R. Stoops, of Nappanee.

The operators' school which was held in conjunction with the convention, in charge of Frank V. Newman, assistant to the president of the Indianapolis Telephone Company was not as big a success as anticipated on account of the heavy duties of operators which prevented a great many from being present.

The convention opened at 2 o'clock Wednesday afternoon with President Frank E. Bohn, of Fort Wayne, presiding. Mr. Bohn in a short address introduced Charles W. Jewett, mayor of Indianapolis, who delivered the address of welcome. Mr. Bohn, in his opening address, sounded the patriotic keynote of the convention when he said that the Independent telephone owners of Indiana are unanimously in harmony with the government plans and stand ready and willing for any sacrifice that is necessary for the winning of the war.

Frank L. Eldridge of the Kellogg Switchboard & Supply Company, of Chicago, read a letter from Captain W. S. Vivian, secretary of the United States Independent Telephone Association, who is now fighting in France, and who sent his best wishes to all members of the association. A motion was adopted instructing the secretary to write to Captain Vivian expressing the good will and good wishes of those who attended the convention.

President Bohn read a telegram from F. B. MacKinnon of Washington, vice-president of the United States Independent Telephone Association, who was to have delivered an address on "Government Control," saying that his work was such that he could not leave it at that time. The address on this subject, however, was delivered by William Fortune, president of the Indianapolis Telephone Company, who had been in conference with the government authorities in Washington regarding the question of government control.

Mr. Fortune told the convention that the government is determined that the telephone business be operated as a single system and that steps be taken by the telephone owners themselves to bring this about. Mr. Fortune said that the postmaster general told him that it was not his desire but the determined policy of the government that this be done.

Paul P. Haynes, a member of the Indiana Public Service Commission, gave one of the most instructive addresses on the subject of "Co-operation Between the Public Service Commission and the Utilities."

Sam Tomlinson, of Plymouth, followed Mr. Haynes with an address on "Co-operation of Telephone Companies with the Public Service Commission."

E. B. Fisher, of Grand Rapids, Mich., who spoke at the opening session Wednesday, gave a brief talk in which he urged the Independent telephone companies to form a much closer organization.

Judge James L. Clarke, of Danville, attorney for the Indiana association, gave a short address.

Claude R. Stoops, of Nappanee, president of the Northern Indiana Telephone Company, who followed Judge Clarke on the program, addressed the convention on the subject of "Accounting."

W. L. Bott, president of the Jasper Telephone Company, spoke on the subject of "Telephone Economics."

In a brief talk just before the convention adjourned, L. C. Griffiths, of Seymour, said he never expected the government to give back the telephone companies to the private owners.

The exhibits of manufacturers in the hotel rooms were unusually comprehensive and interesting.

Michigan Has New Association

The Michigan Telephone Owners Association, for the purpose of co-operating with the Government in telephone matters, was organized at the meeting of telephone owners in the main exchange building of the Citizens Telephone Company in Grand Rapids, September 6. E. B. Fisher, Grand Rapids, was elected president; J. H. Fildew of Pontiac, vice-president; Roy E. Mapes, Grand Rapids, secretary, and R. C. Smith, Homer, treasurer. The board is composed of R. D. Graham, Grand Rapids; W. A. Bahlke, Alma; A. H. McMillen, Saginaw, and W. J. Berry, Detroit. The president, secretary and treasurer are members of the board ex-officio, and the vice-president becomes a member of the board in case the president is unable to serve.

Grand Rapids is the headquarters, but board meetings will be held in Lansing on call of the president.

It is believed that advances in telephone rates and in the salaries of telephone, as well as telegraph, employes, will come as a result of Government control.

Operators Ask Increase

Telephone operators at San Francisco are preparing to submit to the Pacific Telephone and Telegraph Company a schedule calling for an increase in wages to beginners from $1.50 to $2.25 a day and $2 to $4 a day for experienced operators.

The demands were decided upon at a meeting in the Pacific building and will be presented to the company on October 1. The new schedule is proposed to become operative January 1, 1919.

Official Orders and Semi-Official Comment

Installation and Moving Charges Stir Up Much Discussion

Postmaster General's Order No. 1931

August 28, 1918.

OWING to the necessity for conserving labor and material and to eliminate a cost which is now borne by the permanent user of the telephone, a readiness to serve or installation charge will be made on and after September 1, 1918, for all new installations, also a charge for all changes in location of telephones.

Installation charges to be as follows:

Where the rate is $2.00 a month or less	$ 5.00
Where the rate is more than $2.00 but not exceeding $4.00 a month	10.00
Where the rate is more than $4.00 a month	15.00

The moving charge to the subscriber will be the actual cost of labor and material necessary for making the change.

In accordance with Bulletin No. 2, issued by me August 1, 1918, stating that "until further notice the telegraph and telephone companies shall continue operation in the ordinary course of business through regular channels," in all cases where rate adjustments are pending or immediately necessary they should be taken up by the company involved through the usual channels and action obtained wherever possible. In all cases, however, where rates are changed such changes should be submitted to me for approval before being placed in effect.

Telegraph and Telephone Service Bulletin No. 8

September 14, 1918.

ORDER No. 1931, issued by me under date of August 28th, provided certain charges for all installations of telephones on and after Sept. 1st, 1918, also a charge for the "moving" of telephones. On account of the many inquiries regarding the order, the following instructions are issued:

1. Installation charges made effective by Order No. 1931 shall be referred to by telephone companies and collected from subscribers as "Service Connection Charges" and shall be based on the minimum net rate charged to the subscriber. These service connection charges shall be collected from all applicants for new or additional service at the time of application and before such new service or additional service is established.

2. In cases of "Changes of Name" or where no lapse of service occurs, the minimum charge of $3.00 shall apply in all cases.

3. Service connection charges do not apply to extension bells, push buttons, buzzers, or miscellaneous equipment of like character, nor to directory listings.

4. With the exceptions above noted the service connection charge shall apply to each class of service and class of equipment furnished the applicant for which the company shall have a regular separate established rate and the amount of the service connection charge shall be determined by the amount of the regular established rate, in accordance with the terms of Order No. 1931.

5. All subscribers who pay the service connection charges established under Order No. 1931 shall be relieved of any other service connection charges, cancellation charges, charges made in liquidation of damages on account of short terms, and short term rates; and the use of one year or any other period in excess of one month as a minimum contract period for telephone service.

6. The "Moving charge" referred to in Order No. 1931 applies only to changes in the location of equipment on the premises. Such changes are generally known as "Inside Moves." For purposes of economy in administration and for the convenience of the public the charge for moving a telephone set from one location to another on the same premises shall be $3.00. The charge for moving all other equipment from one location to another on the same premises shall be based on the cost of labor and materials.

7. Order No. 1931 abolishes the distinction heretofore made by some companies between a new installation or a new service connection and an Outside Move; and all changes in the location of the subscriber which have heretofore been described as Outside Moves will hereafter be treated as new "Service connections" and subject to the service connection charges of Order No. 1931 and of these instructions supplementary thereto.

8. Service connection charges do not apply to the service known as "service stations" or "switching service"; and they do not supersede special installation or construction charges or mileage charges of any kind.

(Signed) A. S. BURLESON, Postmaster General.

COMMENT BY VICE PRESIDENT F. B. MACKINNON OF THE UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION.

August 31, 1918.

The order of the Postmaster General issued August 28th instructs telephone companies to put into effect certain "installation" and "move" charges and gives instructions relative to the submission to the Postmaster General of all changes in rates before those rates are placed in effect. The Postmaster General states that "In all cases where rate adjustments are pending or immediately necessary they should be taken up by the companies involved through the usual channels and action obtained wherever possible." This is interpreted to mean that application for increase in rates should be submitted to municipal councils or state commissions having authority to pass upon such applications in the same manner as such matters were submitted to those regulatory bodies prior to Government control. Should any council or commission decline to pass upon such application on the ground that they have no authority to do so during the period of Government control, please notify this office at once. In following out the Postmaster General's instructions applications should be prepared and submitted to councils or commissions, even though those public authorities are hesitating or declining to act.

In connection with the installation charges put into effect by this Order No. 1931, the Postmaster General has been asked for instructions as to just what is meant by an installation, whether the rates specified are to apply to the installation of private branch exchange extensions and to the installation of extensions from main lines. The

question has also been submitted as to what account the amounts collected for "installations" and "moves" shall be credited; just what the proper accounting entries are under this order. As soon as we have received answers to these questions a circular will be sent out informing our companies as to the Postmaster General's interpretation of his order.

A supplemental circular to Questionnaire BC-1 has been prepared by the Postmaster General and will soon be sent to companies called upon to answer the questionnaire. This circular gives detailed instructions to Class "C" companies as to their filling out the operating and income blanks of questionnaire. We would suggest that Class "C" companies delay filing their questionnaire until they receive this circular.

September 14, 1918.

On September 11, Bulletin No. 8 in tentative form was submitted by the Postmaster General to representatives of the United States Independent Telephone Association and of the American Telephone & Telegraph Company. Suggestions as to changes in the order were made and adopted so that the order as now put into effect will be interpreted uniformly by the Telephone and Telegraph Administration and the representatives of the telephone companies.

Following this a conference was held between representatives of the Independent and Bell companies at which the explanations given below were agreed upon. Special care should be taken by managers at competitive exchange points to see that the service connection and all other orders of the Postmaster General are applied alike by the managers of the two competitive exchanges so that the public shall receive uniform treatment and neither property be operated at a disadvantage. In cases where the two managers are in doubt or disagree as to interpretation of any order or part of an order the Independent manager should submit the matter immdiately to this Association in Washington for advice and instruction. This course if strictly followed will prevent unnecessary friction. It should be kept constantly in mind by all telephone employes that they are all working for the same employer—The Federal Government.

ASSOCIATION INTERPRETATION OF ORDER NO. 1931 AND BULLETIN NO. 8.

1. The Postmaster General by instructing companies to use the term "Service connection charges" instead of "Installation charges" has indicated that the new charges cover more than charges for physical installation work. The new charges are intended to cover all necessary physical installation work, accounting, listing, terminal labor and other operations incident to the establishment of the connection. The term "service connection charge" should be used invariably by employes of the companies in referring to these particular charges so as to aid the Government in impressing on the mind of the public that these charges as a whole are not necessarily restricted to the cost of labor and material used in establishing the service, but include all items incident to establishing the connection the value of which is definitely lost to the company when the service is discontinued.

2. Paragraph 1 of Bulletin No. 8 says: "Service connection charges shall be based on the minimum net rate charged the subscriber." An example of what is meant by "minimum net rate" is where the charge for service is $2.25 per month with a discount of 25 per cent if paid by the 10th of the month. In this case the net rate is $2.00 which is the rate that will be paid in the majority of such instances. Another example is where a measured rate is in effect that requires the subscriber to pay $3.00 per month for a minimum number of calls and so much per call for all calls over that number. In this case the $3.00 guarantee shall be considered the minimum net rate. Another instance is where a discount is granted employes, charitable institutions, etc. The rate paid by such employes and institutions shall be considered the minimum rate.

3. It has been the practice of some telephone companies to classify as "changes of name" instead of "installations" those cases where a subscriber moves into a vacated residence or office where the telephone company has left in place the telephone equipment and the drop wire. Other companies have classified such cases as "installations." Under paragraph 2 of Bulletin No. 8 the Postmaster General directs that the latter classification be followed except where the new subscriber arranges for the continuance of the telephone service prior to the discontinuance of that service by the former subscriber so that there will be no period when service will not be given to some one at that place—or, as the Postmaster General states, "no lapse of service."

4. Under paragraph 4 of the Bulletin No. 8 it is directed that service connection charges shall be made for each of the following classes of service and equipment separately:

Main line business telephones.	Business extension telephones.
Private branch exchange trunk lines.	Private branch exchange switchboards.
Private branch exchange extension telephone.	Intercommunicating set telephones.
Main line residence telephones.	Residence extension telephones.

For example: For a main line business telephone with an extension telephone connected, where the business rate is $2.50 and the extension rate $1.00, the "service connection charges" shall be $15.00; $10.00 for the main line service and $5.00 for the extension.

5. The effective date of Order No. 1931 and Bulletin No. 8 is September 1st. All charges covered by these orders must be collected for all installations, changes of name and moves made on or since that date. Where applications for service were received or contracts for service were entered into or work begun on installations, changes of name or moves prior to September 1, these service connection charges do not apply but such charges shall be made as were in effect prior to September 1.

LIBERTY BOND PURCHASES.

A number of companies have inquired as to the right or propriety of telephone companies purchasing Liberty Bonds of the Fourth Loan, which are about to be offered the public. The Postmaster General states that companies may purchase such bonds with surplus funds but that operating funds should not be so invested but should be kept in hand for use. Companies that in the three preceding Liberty Loan Campaigns have made subscriptions for bonds on behalf of employes and permitted the employes to reimburse the company by installment payments

should arrange with their bankers to have such installment payment privileges extended directly to the employes by the bankers so that the Telephone and Telegraph Administration will not be involved in those transactions.

EXEMPTION OF EMPLOYES.

Managers making application for exemption of employes under Bulletin No. 7 should file copies of Bulletin No. 7 with local and district boards so as to inform those boards as to the authority for making the application.

Telegraph and Telephone Service Bulletin No. 6

September 5, 1918.

Some telephone and telegraph companies have reported to the Department that they are being seriously embarrassed in the operation of their services by employees leaving immediately upon submitting their resignations. In many cases they do so to engage in nonessential work. In order that the telephone and telegraph services may not be handicapped in their operation employees should give the usual two weeks' notice when they desire to terminate their employment.

A. S. BURLESON, Postmaster General.

Telegraph and Telephone Service Bulletin No. 7

September 10, 1918.

Telegraph and telephone companies are hereby authorized to file claims with the local exemption boards for deferred classification for employees who are absolutely indispensable to the operation of the service. The claims for deferred classification shall be sworn to by the supervisory officer under whom the employee works. However, before filing the claim with the local exemption board it must be approved by the division head in charge of the territory in which the employee is registered.

A. S. BURLESON, Postmaster General.

Postmaster General's Order No. 1997

September 10, 1918.

David J. Lewis, chairman; John C. Willever, vice-president, Western Union Telegraph Company, and Edward Reynolds, general manager, Postal Telegraph-Cable Company, are hereby designated to make the necessary studies and recommendations to the Postmaster General with a view to standardizing the rate schedules of telegraph service throughout the United States.

Order No. 1998

David J. Lewis, chairman; Harry B. Thayer, vice-president, American Telephone & Telegraph Co., and Charles Y. McVey, president of the Ohio State Telephone Company, are hereby designated to make the necessary studies and recommendations to the Postmaster General with a view to standardizing the rate schedules of telephone service throughout the United States.

William S. Ryan, assistant superintendent, Division of Post Office Service; John B. Colpoys, special agent, Department of Labor; Union N. Bethell, first vice-president, American Telephone & Telegraph Company; F. B. MacKinnon, United States Independent Telephone Association, and Miss Julia S. O'Connor, representing the organized telephone workers of the country, are appointed a committee to investigate the working conditions of and wages paid to employees of the telegraph and telephone companies, and report as to what improvements, if any, should be made in the working conditions, the wages which should be paid the various classes of employees, and the feasibility of standardizing the same.

Committee to Investigate Railroad Telegraph Lines

The Postmaster General has appointed Joseph Stewart, special assistant to the Attorney General; G. W. E. Atkins, first vice-president, Western Union Telegraph Co.; and John Barton Payne, chairman of the general counsel of the Railroad Administration, as a committee to make careful investigation of the contractural relations between the railroads and the various telegraph companies, and to report what changes, if any, should be made in these contracts or in the service rendered.

The Postmaster General has appointed Messrs. Henry Carter Adams and David Friday as statisticians in connection with the operation and control of the telegraph and telephone systems.

Mr. Adams is head of the department of economics of the University of Michigan; was statistician of the Interstate Commerce Commission, and more recently adviser to the commission of the Chinese Republic on standardization of railway accounts and statistics.

Mr. Friday is head of the department of economics in the New York University School of Commerce and Finance; was valuation expert of the Michigan Railroad Commission, and is a tax expert in public utilities and financial matters.

Postmaster General Burleson has appointed a special committee to investigate contracts with railroads of telegraph and telephone companies consisting of Joseph Stewart, special assistant to the attorney general; G. W. Atkins, vice-president of Western Union Telegraph Company, and John Barton Payne, counsel for Railroad Administration; Henry Carter Adams, formerly connected with the Michigan University and the Chinese Railway Commission, and David Friday, head of the Department of Economics of New York University.

State Commissions Object

Several of the state public utility commissions have voiced exception to Postmaster General Burleson's Order No. 1931 and its explanatory bulletin No. 8, setting standard rates for installation and moving charges.

Contending that telephone installation charges ordered by Postmaster General Burleson are excessive as far as Ohio is concerned, the State Public Utilities Commission unanimously refused to approve them.

"An installment charge of $5 to $15 in Ohio is outrageous, outlandish and positively wrong and inexcusable," declared C. C. Marshall, chairman of the commission. "Such a rate may be all right in New York, for all I know, but Burleson can't shove it on us here in Ohio without our protest. It may be Burleson has the

power to force it through and that's what he'll have to do in this state. He can't collect it under Ohio laws. It may be he can under Federal laws, but if so he'll have to fight for it.

"We fell right in line with the Federal Government on railroad rates because that looked fair to us. But they can't put over on us such a thing as these telephone charges without a fight."

Every telephone subscriber for all time to come stands to pay more for service by reason of Postmaster General Burleson's order requiring an installation charge of from $5 to $15, so Beecher W. Waltermire, member of the Ohio commission, declared.

Under accounting rules laid down by the Interstate Commerce Commission and adopted by practically all state commissions, including the Ohio commission, an installation charge is charged on the books of the company to capital account on which service rates are computed. Mr. Waltermire pointed out that in the course of a few years these installation charges probably will run into millions of dollars with the larger companies and according to the accounting rules must be included in the valuations on which service rates are computed.

He said that by charging these installation charges to capital account, the people for all time will be paying on a largely fictitious investment. He pointed out that an investigation by the Minnesota commission showed that the actual installation cost is but 68 cents where connections are already in place, and so on a $5 charge the company would be adding a fictitious investment of $4.32 to its capital on which the subscribers' rates will be based.

The Minnesota Railroad and Warehouse Commission protested to Postmaster General A. S. Burleson against the federal order permitting telephone companies to charge $5 to $15 for installing or moving telephones. The commission's protest, drawn by Fred W. Putnam, says the charge is excessive, that $5 will cover the cost in all cases and that a greater charge will reduce the number of subscribers, cut the revenue of the companies and cause facilities to remain idle.

Vic Wilson, one of the members of the Nebraska State Railway Commission, threatened to bring an injunction in the Federal court to restrain the Postmaster General and the telephone corporation from collecting for this service.

Chairman S. P. Kennedy of the Alabama Public Service Commission, wrote to a petitioning telephone company regarding the Burleson charges:

"These charges, if established, result in an additional charge to the subscriber, which to all intents and purposes is an advance in rates. If the authority for making telephone rates within the state of Alabama is now lodged with Mr. Burleson, then an approval of any charges which you contemplate making is not at all necessary by this commission.

"Further, it has never been the policy of this commission to approve rates and charges until after a thorough investigation, and I am frank to say to you, without an investigation, the charges herein proposed appear to this commission, prima facie, unjust and unreasonable, therefore, this commission declines to approve them."

The Georgia Railroad Commission in regular session refused to approve the petition of the Southern Bell Telephone Company, which asked for increased installation charges as scheduled by the Postmaster General's order.

Giving as its reasons that the charge is excessive and that the regulations will materially handicap production of farms and efficiency of business and industrial concerns and that volunteer war work will be handicapped, the Montana Public Service Commission sent to Postmaster General A. S. Burleson a protest against the "installation charge" of from $5 to $15 recently set forth in an order from the department.

The commission, while disclaiming any intention to hinder the work of handling the telegraph and telephone lines of the nation, and expressing an earnest desire to co-operate, it feels that the rates will retard the development of the resources of Montana.

New York Service Suffers

Many New York apartment houses and residences will be without telephone service this winter as a result of the orders issued by the Postmaster General.

The orders went into effect September 1, but their full force is only beginning to be felt in many parts of the city. The order prohibits the installation of new telephones and also bar additions or extensions to service now in force in business houses or residence, except in the cae of essential war industries or where it is proved such service is essential for commercial needs.

Many apartment house owners in Manhattan, the Bronx and Brooklyn had arranged to discontinue the branch exchanges in their houses. The plan was to have only a booth in the hall and for tenants who desired to have their own lines installed. The owners' motive was partly, they said, to lower costs and reduce unnecessary calls.

The tenants, in most cases, were notified that the branches would be taken out on October 1. Now that tenants who applied since September 1 for telephones are being refused, the owners are trying to revoke their cancellations of branch service. They are told the cancellations are final and that the branches must come out. Tenants, many of whom supposed they had almost a month in which to make contracts with the telephone company, cannot have their own lines put in.

One big apartment house owner in Brooklyn declared he saw no way to provide any telephone service for his tenants, and many others throughout the city are believed to face the same situation.

Transfer of contracts is permissible, and it is expected a flourishing business will grow up in this. Contracts are at a premium now, especially among residence buyers and builders in outlying districts.

One case is cited of a Brooklyn family which bought a house that has a telephone, had it wired for extensions and even offered to have its own telephone put in if the company could only give it service. The offer was refused, as the man who sold the house is clinging to his telephone contract.

A. L. Faulkner, Ohio representative of the federal department of labor, was authorized by the office of Secretary of Labor Wilson at Washington to begin at once a survey of the labor situation affecting the Ohio State Telephone Company and the Cleveland Telephone Company.

This was the result of a visit to Washington by Clarence Sickman, business agent of the Cleveland locals of the Electrical Workers' union, in an effort to protest against what he and Secretary John A. Groves of the union term unjust working conditions.

State Commissioners Report on Federal Control

National Association Addresses Bulletin 17 to State Bodies

IMMEDIATELY upon the adoption of the joint resolution by Congress, the special war committee of the National Association of Railway and Utilities Commissions tendered to the President the cordial support of all of the state commissions with their staffs of expert men. This letter was duly acknowledged.

When it became known that the Honorable Albert S. Burleson, postmaster general, had been selected to control, operate and supervise the wire systems, your committee transmitted a letter to him, which reads in part as follows:

All but one of our states maintain railroad or utilities commissions. All but five of the states have commissions which control the rates and service of telephone companies, the exceptions being Arkansas, Delaware, Iowa, Texas and Utah. Efficient and well-equipped departments are maintained, employing experts familiar with the telephone business. These commissions are interested primarily in good service at reasonable rates. I earnestly suggest that you avail yourself of the experience and judgment of these commissions.

At the same time a request was made to have the commissions supplied with copies of all orders, circulars and bulletins issued by the postmaster general. This request has been agreed to.

Upon July 30 members of our executive and special war committees held a conference with the postmaster general and his telephone committee, consisting of John C. Koons, David J. Lewis and William H. Lamar. Discussion involved the history of regulation and the rules and practices of state commissions in relation to rates, service, accounting and other incidental matters. It was strongly urged that no changes should be made in rates, toll as well as exchange, without affording the public an opportunity to be heard before the local commissions.

Mr. Burleson and his associates gave close attention to the statement of our committee, and he expressed a willingness to co-operate with the commissions, and invited suggestions and advice from them. He stated that he had not as yet formulated any definite policy, but indicated that rates should be standardized, and that he expected to assert jurisdiction over toll and exchange rates. After this conference, a letter was sent to him, which reads as follows:

Confirming our conversation with you this afternoon, the special war committee of the National Association of Railway and Utilities Commissioners, in behalf of that association, desires to offer you its co-operation in your new task of directing the affairs of the telephone and telegraph properties of the country. We wish the federal administration to be an unqualified success in the public interest, and if we can help in achieving that result, we want you to feel that you can call upon us at any moment. In making this statement we are assured that we are merely recording the sentiments of every state public service commission in the country.

In all but five of the states, these commissions have supervision over telephone rates and service, and they have built up special departments for the handling of this work. Outside of the companies themselves, we think it safe to say that the state commissioners have more extensive and more expert knowledge of the properties, and of the public problems involved in their administration, than any group of men in the country. This knowledge is at your command so far as you may desire to avail yourself of it.

We realize that you have not as yet had time or opportunity to determine upon definite plans for the carrying on of your new work. For the present, therefore, beyond our general offer of co-operation, we have only one or two suggestions to make.

In many states there are a very large number and variety of telephone companies, conducting, in many instances, a strictly local business. Confusion is likely to arise as to the status of these and other companies under the new dispensation. Until you have time to canvass the situation thoroughly, which will in itself prove no easy task, we suggest that confusion can be avoided and public rights preserved by announcing that it is your desire that the companies should continue to observe local police regulations and respond to the supervision of the state commissioners in the same manner as heretofore. Failure to do this, we fear, may lead to a misunderstanding, on the part of both the companies and the general public, and interfere with the proper functioning of the system of public control which has been established all over the country for the protection of the public interest. Such an announcement would, as we understand the situation, be in entire accord with the spirit and intent of the resolution of Congress dated July 16, 1918, and the proclamation of the President issued thereunder.

Under the existing system of public control, it is a very general provision of the statutes that all rates must be filed with the commissions, and that no changes may be made without due notice to the public, subject to the power of suspension by the commissions pending investigation. If, after your study of the situation, you should be inclined to the view that the national interest in the present emergency demands some change in this established mode of regulation, the only other suggestion that we now have to offer is that you should consult with representatives of the state commissions before reaching any definite conclusion. In view of our knowledge of local conditions and of our past experience, we feel that we may be in a position to help you avoid possible errors into which you might otherwise unwittingly be led.

The past month has been an organization period. Much attention has been given to the amount of compensation which the government must pay for the use of the wire plants. The postmaster general is inclined to favor the elimination of competing toll lines and local exchanges. Where companies seek to sell or purchase a plant, or agree upon a division of territory, or to effect consolidations, they should conform to the laws of the several states by presenting their applications to, and receiving the approval of, the local commissions. A consolidation committee has been appointed, consisting of N. C. Kingsbury, of the Bell system, and G. W. Robinson, president of the United States Independent Telephone Association. These gentlemen are not on the payroll of the government.

Until otherwise ordered, all companies must file their rates, rules, regulations and reports, with the commissions as provided by law, and all applications for rate increases or adjustments which are immediately necessary should be taken up by the company involved through the usual channels. Where changes are secured, they should be submitted to the postmaster general for approval before being put into effect (see Postmaster General's Bulletin 5).

It is rumored that a rate standardization committee is to be appointed, consisting of David J. Lewis as chairman and one member each from the Bell, Independent, Western Union and Postal companies. Apparently the postmaster general desires to establish a standardization of toll and exchange rates throughout the country, and it will be the duty of this committee to submit a plan to him for his approval.

This idea is not new. It has been advocated by the telephone companies for some time. Most of us know that standardization of rates has an upward

tendency and, therefore, it would be advisable for state commissions to investigate this subject and be prepared to offer constructive and helpful suggestions at the proper time.

On August 28 the postmaster general issued his Bulletin No. 5, which orders the telephone companies on and after September 1, 1918, to charge for all new installations upon the following basis:

Where the rate is $2 a month or less, $5; where the rate is more than $2, but not exceeding $4 a month, $10; where the rate is more than $4 a month, $15.

The telephone companies will obey this order, and will file tariffs containing these charges with state commissions for their information, thus conforming to the practice which has been adopted by the railroad administration. The theory of this order is that it will conserve labor and material and eliminate the cost which is now borne by the permanent users of the telephone.

In conversation with members of the postmaster general's staff, it has been developed that this charge was not based upon the cost of installation, and that it has no relation to any difference which may exist in the cost of installing telephones which have a different rental value. It is arbitrary, and the $10 and $15 charges especially impose an unusual burden upon the new subscribers.

It may be of interest to know that in July of this year the Bell, the Tri-State and the Zenith telephone companies filed an application with the Minnesota Railroad & Warehouse Commission for an installation charge of $5 to new subscribers in the three large cities in that state, and of $3.50 at all other exchanges.

The last paragraph of Bulletin No. 5 refers to rates, and reads as follows:

In accordance with Bulletin No. 2, issued by me August 1, 1918, stating that "until further notice telegraph and telephone companies shall continue operation in the ordinary course of business through regular channels," in all cases where rate adjustments are pending or immediately necessary, they should be taken up by the company involved through the usual channels and action obtained wherever possible. In all cases, however, where rates are changed, such changes should be submitted to me for approval before being placed in effect.

We are informed by William H. Lamar, solicitor for the postoffice department, that telephone companies should present their applications for increases in the usual way, and that commissions should proceed to hear, try and determine the cases and serve orders upon the companies. Such service will be notice to the postmaster general, who claims the right to set aside or modify the order.

He asserts that he has the rate-making power over all toll and exchange rates and charges, state as well as interstate, and that state commissions have no right to interfere with a rate which has been prescribed by him; and that such rates need not be submitted to local authorities for their approval. The government is in control of the telephone systems; it will collect the money for services through the postoffice department; pay all of the operating expenses; and is alone responsible for the service rendered. With respect to the question of jurisdiction over rates, it is apparent that the postmaster general and the railroad administration are in complete accord.

By the terms of the resolution, the President is authorized, during the continuance of the present war, whenever he shall deem it necessary for the national security or defense, to take possession and assume control of any wire system or systems, such operation and control not to extend beyond the date of the proclamation by him of the exchange of ratifications of the treaty of peace.

Compensation shall be made for the use of the properties, and the resolution closes with the following proviso: "That nothing in this act shall be construed to amend, repeal, impair or affect existing laws or powers of the several states in relation to taxation or the lawful police regulations of the several states, except wherein such laws, powers or regulations may affect the transmission of government communications or the issue of stocks and bonds by such system or systems."

The proclamation of the President is based upon the act of Congress. It is an exercise of the war power which is directly conferred upon the President by the Constitution, and the act of Congress has added nothing to that power. Congress has not directly repealed any state law, and repeals by implication are not favored by the courts; but, on the contrary, Congress has said that existing laws or powers of the several states, in relation to taxation and the lawful police regulations, shall not be impaired except wherein they may affect the transmission of government communications or the issue of stocks and bonds.

Whether the national security and defense either justifies or permits the postmaster general to impose installation charges, standardized rates, to increase or modify intrastate, toll or exchange rates or set aside existing state laws which provide for the filing and approval of rates, rules and regulations by state commissions, is at least a debatable question. An interesting review of the general question has been made by Hon. William L. Ransom, counsel to the Public Service Commission for the First District, New York City, in opinions rendered January 21, 1918, and June 1, 1918.

The postmaster general and his telephone committee are pronounced advocates of government ownership of the telephone and telegraph systems. As the law now stands, these properties must go back to private ownership when peace is declared. It is for the people and Congress to decide whether government control shall be merged into government ownership.

As regulating officials, we must act in accordance with the existing law regardless of our individual opinions. When the wire systems return to private ownership, if they do, they must submit themselves to local regulations and to the laws, rules and practices which have been established. It is essentially in the public interest that the state commissions be preserved in all of their vigor and efficiency, so that the companies, if and when they return to private ownership, be intelligently regulated. It would seem most unfortunate if the exigencies of the war were used by officials of the national government to destroy or weaken the wise regulatory practices in the states which have grown up through the experience of the past 35 years.

State commissions have tendered their offer of cooperation in good faith. They should and will do their full duty in helping to prosecute the war to a successful conclusion, but at the same time they should see that adequate service and rates are furnished.

The successful assumption of ultra-governmental power by the postmaster general may result in depriving the people of every vestige of local control in this matter. The problem is of so much importance that state commissioners and their counsel should give immediate attention to the fundamental as well as legal questions that are involved in the present system of operation.

Design of Transpositions for Parallel Power and Telephone Circuits

Presented at the 34th Annual Convention of the American Institute of Electrical Engineers

BY HAROLD S. OSBORNE

This paper presents the results obtained in a recent design of transposition systems for telephone circuits exposed to induction from circuits of other kinds, particularly from three-phase power circuits, and the co-ordinate arrangements of transpositions in the power circuits. The new arrangements are the result of a systematic investigation of the degree of flexibility which could be obtained in the co-ordination of telephone transpositions and transpositions in outside disturbing circuits, particularly three-phase power circuits.

In presenting the results obtained, a discussion is first given of the requirements which must be met by systems of transpositions for telephone circuits in general, and by the new "exposed line" system in particular. An outline is given of the methods used in the design work and the theory upon which it is based. The diagrams in the paper show the arrangements of transpositions for all circuits on eight crossarms of telephone line. The results to be obtained from the use of these diagrams are outlined, and the suitable locations of co-ordinate transpositions in parallel power circuits are discussed.

The application of these and other arrangements of co-ordinated transpositions to specific cases must take into account the variations in separation and other changes in the power and telephone circuits. It is considered to be beyond the scope of the present paper to go into a discussion of the problems involved in these specific applications.

IN a well-engineered telephone system the power transmitted into a long-distance telephone circuit is almost entirely absorbed in line losses. The circuit terminates in that marvelous little electric motor, the telephone receiver, which requires only a few millionths of a watt for its operation. As the power delivered to the line by the telephone transmitter may be measured in hundredths of a watt, only a fraction of one per cent of the transmitted energy need be received at the far end of the line. This is fortunate, for as the telephone currents are of relatively high frequency, the energy losses suffered by transmission over a given circuit are very much greater than would be the losses for 60-cycle current. Moreover, the telephone currents must be carried over very great distances. It has therefore been necessary to do an enormous amount of work in developing means for increasing the efficiency of long telephone circuits in order that country-wide service may be given with a network of conductors which should not be prohibitively expensive.

The large ratio between the energies at the transmitting end and at the receiving end of a long distance telephone line imposes very severe limitations on the amount of inductive effect which can be permitted between different telephone circuits. If the transfer of energy between two circuits is more than a millionth of the energy transmitted there is danger that one can overhear on one circuit what is said on the adjacent end of the other. This must of course be avoided, and an even stricter limitation of the transferred energy is desirable.

The method which is used to prevent excessive transfer of energy between telephone circuits on the same pole line is the installation of a systematic arrangement of transpositions of the conductors of each circuit.

Present standard telephone practice for open-wire circuits provides ten wires spaced about one foot (0.3 m.) apart on a crossarm and any number of crossarms spaced two feet (0.6 m.) apart on a pole. The currents carried by these circuits are of very high frequency compared with those used in power practice and tend to make much of small mutual impedances or admittances between the circuits. It is small wonder then that when in 1886 the first long distance telephone line was built between New York and Philadelphia it was found that, listening at the distant end, an observer could not tell which circuit was used for transmission but could hear equally well on all of them. The systematic study of telephone transpositions began at that moment and has continued until the present day.

One factor which has much complicated the study of telephone transpositions is the common use of phantom circuits. These are more accurately described by the French terms *derived* or *superposed* circuits. A phantom circuit is formed by superposing a third circuit on two 2-wire telephone circuits called the side circuits of the phantom. The phantom and its side circuits thus use the same copper conductors, and it is evident that great care in balancing the inductive relations is necessary to prevent the transfer of energy between circuits so intimately related.

Long distance telephone lines have not grown up without neighbors, and in the design of telephone transposition systems it has been necessary to take them into account. Telegraph systems and power transmission systems have been contemporaries with the telephone system in the process of development. These systems have not in general been obliged, for any reason of their own, to restrict their electric and magnetic fields as has been necessary with telephone circuits. From the first, however, the limitation of the effect of these outside fields has been a factor in the design of telephone transposition systems.

It is evident that when a telephone circuit is paralleled by an electric power circuit carrying hundreds or even thousands of kilowatts, the mutual inductive connection between the two circuits must be extremely minute if we are to avoid induction in the telephone circuit of power of the same magnitude as that of the voice currents or even much more. In fact, this difficult problem would probably be quite impractical of solution if we had to rely alone upon balance produced by transpositions. Fortunately, another very weighty factor works for the solution of the problem. The fundamental frequency of commercial power circuits is out of the easily audible range and quite out of the range of frequencies which the telephone line must transmit in order to reproduce intelligible speech. As a matter of fact

the noise produced by power circuits in telephone circuits is practically not at all due to the fundamental but due to the harmonics or high-frequency components of the power circuit which lie within the range of telephone frequencies. The energy represented by these harmonics is represented by kilowatts or even by watts rather

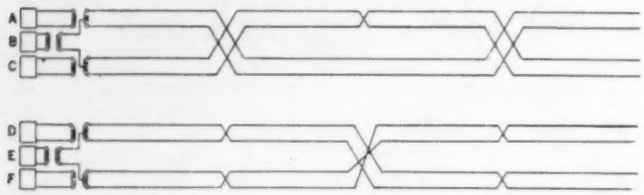


Fig. 1.—Phantom Telephone Circuits.

than by thousands of kilowatts. In spite of this fact the degree of balance required in cases of close parallel is very precise indeed.

Of all the means used to reduce the inductive effect between power circuits and telephone circuits the coordinate transposition of both classes of circuit is probably the most generally important. The application of this means to parallels between telephone and power circuits is in practical cases attended with difficulties because instead of two circuits running accurately parallel for long distances the separation usually varies at frequent intervals and very irregularly.

The usual case, in which the power circuit is three-phase, presents another complication which is fundamental to this type of circuit. The telephone circuit is a single-phase circuit and its conductors have only two relative arrangements on the pins. The three-phase circuit has three possible arrangements of its conductors on the pins, and three sections of line, each with a dif-

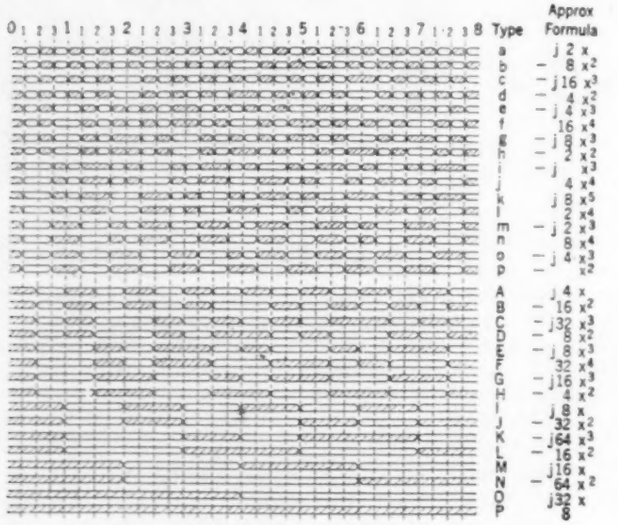


Fig. 2.—Typical Arrangements of Transpositions.

ferent arrangement, are necessary for what is called a "barrel" of the power circuit. The combinations of relative pin positions of the two circuits when both are transposed are, therefore, six in number. The difficulties introduced by this relation have been discussed in an earlier paper* before the institute.

Although the importance of neutralizing as far as

*"*Inductive Interference as a Practical Problem,"* Messrs. Griswold & Mastick, *Transactions*, 1916, p. 1051; Telephone Engineer, October, 1916.

TABLE I.—CAPACITIES IN MICROMICROFARADS PER KILOMETER IN A 40-FT. NO. 12 N. B. S. G. 40-WIRE POLE LEAD.
Direct Capacities Between Wires.

Wires	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Earth
10										103		603	323	161	100	55	39	37	40	58																					382
9									89	81		639	469	249	146	86	63	55	47	58																					372
8								92	81			669	571	423	267	154	98	85	70	85																					191
7							108	90				669	635	541	460	314	216	189	144	191																					181
6						142	114	111				602	541	693	604	384	289	254	191	254																					205
5					239	164	157					274	693	804	693	493	370	325	244	325																					
4				390	333	255	255					155	274	493	804	630	474	416	312	416																					
3			716	593	659	475	475					132	155	370	630	804	604	530	398	530																					
2		1765	1579	1509	1703	1030						122	132	274	493	604	804	704	528	704																					
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10	1											631	639	469	249	146	86	63	55	47	58																			
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8	3											198	362	435	541	460	314	216	189	144	191																			
7	4											132	155	274	464	693	384	289	254	191	254																			
6	5																																								

Wires	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Earth
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Wires	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Earth
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Wires	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Earth
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Wires	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Earth
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Wires	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Earth
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Wires	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Earth
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practicable the effect of outside circuits has always been a factor in the design of transposition systems, the possibilities of coordinating the telephone transpositions with the transpositions in three-phase power circuits were not at first fully developed. With the great growth in both telephone circuits and three-phase power circuits this matter has been growing rapidly more important in telephone transmission.

In connection with the very extensive investigations of the Joint Committee on Inductive Interference in California it was therefore considered advisable to undertake the development of a new system of telephone transpositions which would embody the maximum possibilities of co-ordination of transpositions in the two classes of circuit. There has resulted from this work a system of transpositions known as the "exposed-line" transposition system.

OUTLINE OF METHODS OF DESIGN

The design of a transposition system requires the mastery of a very difficult and complicated technique. It is attempted here to give only a general outline of the methods employed and some of the difficulties encountered and overcome. Some of the mathematical work is given in the appendices.

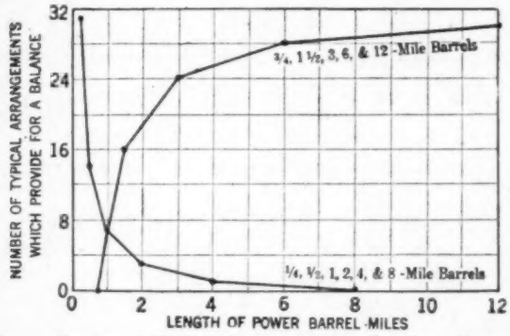


Fig. 3.—Number of Typical Arrangements of Telephone Transpositions which Co-ordinate with Three-Phase Power Lines Transposed with Different Lengths of Barrel.

Conductive and Inductive Connections. The mutual connection between two circuits may be of any of the following characters:

Resistance
Leakage
Inductance
Capacitance

Two circuits may be said to be unbalanced with respect to each other by a mutual connection of any of the four above characters when the mutual connection enters into the circuit in such a way that current in one circuit tends to cause a current in the other circuit.

By resistance and leakage we denote conductive connections respectively series and shunt. Although two metallic circuits which have no resistance in common cannot have a mutual resistance unbalance, care is necessary to avoid a mutual resistance unbalance between a phantom and its side circuits. This is however a matter apart from transpositions. The leakage from telephone circuits is almost all directly to ground. This is normally kept very low because of the large effect which high leakage would have upon the efficiency of the circuits. For these reasons leakage is not an appreciable factor in the interference between telephone circuits, except under abnormal conditions, such as those produced by baling wire thrown over a telephone line.

Two circuits strung side by side have both mutual inductance and mutual capacity unbalances. The two terms represent the coefficients by which are measured the unbalanced action of the mutual electromagnetic and electrostatic fields respectively, and both represent inductive rather than conductive effects. It is the purpose of transpositions to correct for these as largely as may be.

Inductive Effects Between Telephone Circuits. The general equations for the mutual inductive effects between long parallel circuits are hopelessly complex. For the benefit of those interested a discussion is given in Appendix A of the mathematics by which these inductive effects may be computed in some simple special cases. In Appendix B are given equations for the most simple general case, that is, the case of inductive effects between two long symmetrical parallel wires with ground return. Examination of equations (7) to (10) in this appendix shows that the current or voltage in either conductor is represented by the sum of two complex exponential terms. Little consideration is required to convince one that similar general equations for forty parallel wires would be impracticable either to establish or to use.

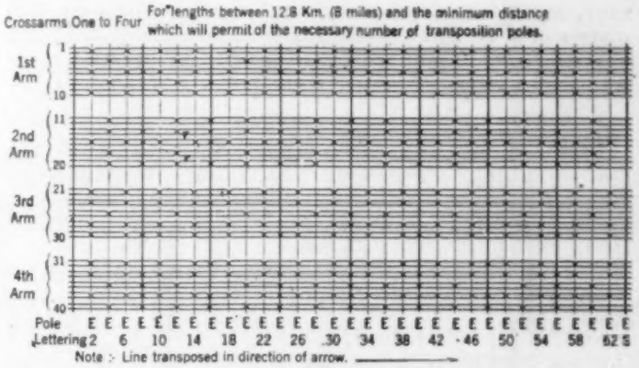

Crossarms One to Four
For lengths between 12.8 Km. (8 miles) and the minimum distance which will permit of the necessary number of transposition poles.
1st Arm
2nd Arm
3rd Arm
4th Arm
Pole Lettering
2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62 S
Note :- Line transposed in direction of arrow.

Fig. 4.—E Section—Transposition System for Non-Phantomed Circuits on Exposed Telephone Lines.

However, in studying the inductive effects between telephone circuits (commonly called cross-talk), use can fortunately be made of a beautiful simplification. Although the circuits are very closely associated on the same pole line, the requirement for good operation after the circuits are transposed is that the transfer of energy from one circuit to another shall be exceedingly small. This being the case, the reaction of the induced current on the inducing circuit is evidently negligible. The problem can therefore be studied by computing the current and voltage of the inducing circuit as though no currents whatever were induced in other circuits and then comput-

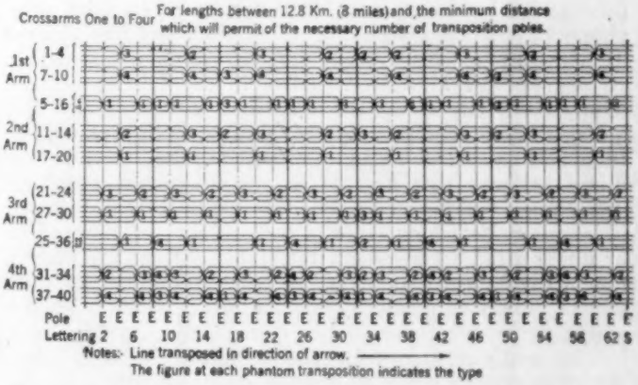
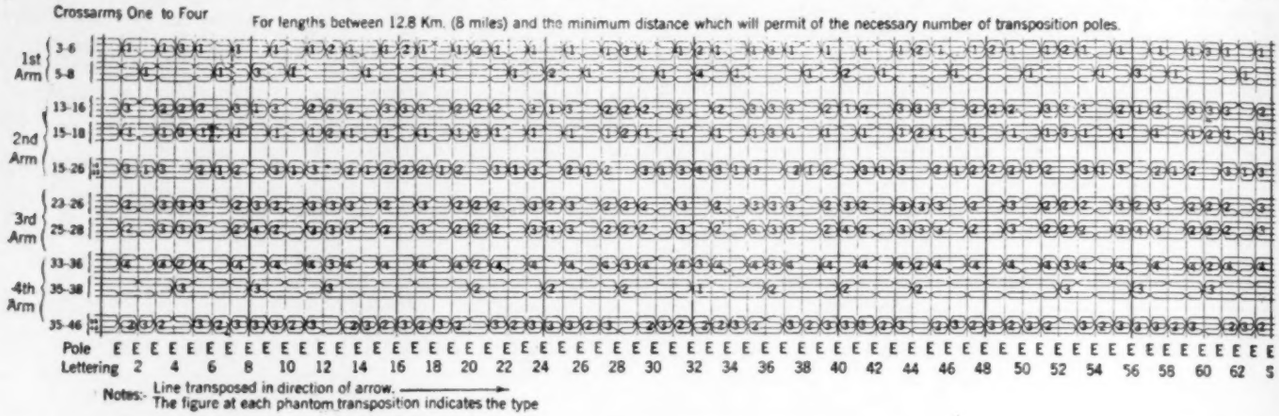


Fig. 5.—E Section—Transposition System for Phantomed Circuits on Exposed Telephone Lines—Arrangements for Phantoming All Circuits.

ing the inductive effect of these currents and voltages on each adjacent circuit under the assumption that no current flows in any of the other circuits.

In order that this computation may be carried out, it is necessary that the coefficients of induction between the circuits be determined. The mutual inductance unbalance between all pairs of circuits on a 40-wire pole lead can be readily computed. It was estimated, however, that to compute the direct capacities between circuits would require the time of one man for at least ten years. It was therefore found much cheaper and more practical to make measurements of the capacities between the wires in a short section of line under construction. The results obtained in this way are given in Table I.


Crossarms One to Four
For lengths between 12.8 Km. (8 miles) and the minimum distance which will permit of the necessary number of transposition poles.
1st Arm
3-6
5-8
2nd Arm
13-16
15-18
15-26
3rd Arm
23-26
25-28
4th Arm
33-36
35-38
35-46
Pole Lettering
E E E

venient and economical to arrange the transpositions for each circuit in accordance with one or another of a list of selected typical arrangements. In Fig. 2 are shown the types, 32 in number, suitable for use in a transposition section made up of 32 parts of equal length. Reading from bottom to top, the types are arranged in the drawing so that each type has one more transposition per section than the preceding type.

The type unbalance between two telephone circuits is determined by the relative transposition of the two circuits, that is, the points at which one circuit is transposed but not both. The typical arrangements of transpositions have the characteristic that the exposure between any two circuits so transposed can be represented by some other type; that is, the exposure between any two types is the same as the exposure between some other type and a circuit without transpositions. For example, exposure f to $k =$ exposure F to $K = A$, exposure J to $m = k$. For transposition sections divided into 64 equal parts, 32 more typical arrangements can be added to the 32 shown in the figure by adding a transposition at the midpoint of each elemental length of each type.

Typical Arrangements for Exposed Lines. The purpose of the exposed-line transposition system is particularly to provide increased facility in balancing the induction from outside circuits in so far as this can be done by transpositions. The effect of outside circuits in inducing voltages between the telephone wires and the ground which may be productive of very serious interference cannot be remedied by transpositions in the telephone circuits, but can frequently be greatly reduced by transpositions in the outside circuits. The telephone circuit transpositions must be designed to equalize the voltages induced in the two sides of each telephone circuit with the greatest possible flexibility in the location of the transpositions in the outside circuits. This imposes great limitations on the typical arrangements of transpositions which can be used.

The outside disturbing circuits can be classified as follows:

1. The non-transposed circuits such as telegraph circuits. This applies also to the residual components of current and voltage in power circuits.
2. Two-wire transposed circuits such as single-phase power circuits.
3. Three-phase power circuits.

In order that the disturbing effect of circuits of the first class may be reduced as far as possible, no typical arrangement of telephone transpositions can be used whose type unbalance factor to non-transposed circuits exceeds a certain value. This eliminates a few of the types having the least numbers of transpositions.

Two-wire outside circuits can best be transposed in accordance with some of the typical arrangements for telephone circuit transpositions. A balance to these circuits requires then that certain types be set aside for their use and that the exposures between the transposed telephone circuits and the outside circuits transposed in accordance with these types be kept below the limiting values set for type unbalance for these cases.

The inherent complication in balancing the inductive effects between telephone circuits and three-phase power circuits arises, as has been noted, from the fact that a three-phase circuit has three different arrangements of conductors on the pin positions and a two wire telephone circuit has but two. There are, therefore, six combinations of relative pin positions of the two circuits, all to be used for equal lengths of line.

In considering the severe restrictions placed on the selection of telephone transposition types by the necessity of balancing to transposed three-phase power circuits, the following conditions may be noted:

1. If the barrels of the power line are very long, they can be made to co-ordinate with almost all of the typical arrangements by having each non-transposed section of power circuit, that is, each third of a barrel, equal in length to one-half or one-fourth of the telephone transposition section, for most of the typical arrangements balance within this length. This is shown in Fig. 3, assuming 12.8 km. (8 miles) to be the length of the telephone transposition section. Thus with a 19.2-km. (12-mile) power barrel the telephone circuits may be balanced for each 6.4-km. (4-mile) non-transposed length of the power circuit. However, as the length of the power barrel is progressively decreased to 9.6 km. (6 miles), 4.8 km. (3 miles) 2.4 km. (1½ miles), etc., the number of typical arrangements of telephone transposition which can be used very rapidly decreases.

2. If the barrels of the power line are very short, they may be made to co-ordinate with all the typical arrangements by having a complete barrel between telephone transpositions. In the case shown in Fig. 3 this requires a 0.4-km. (¼-mile) barrel. As the length of the barrel is increased, however, to 0.8 km. (½ mile), 1.6 km. or 3.2 km. (1 to 2 miles), etc., the number of typical arrangements of telephone transposition which can be used, very rapidly decreases.

3. Barrels in the power line of relative lengths other than those mentioned do not in general co-ordinate with telephone transposition arrangements.

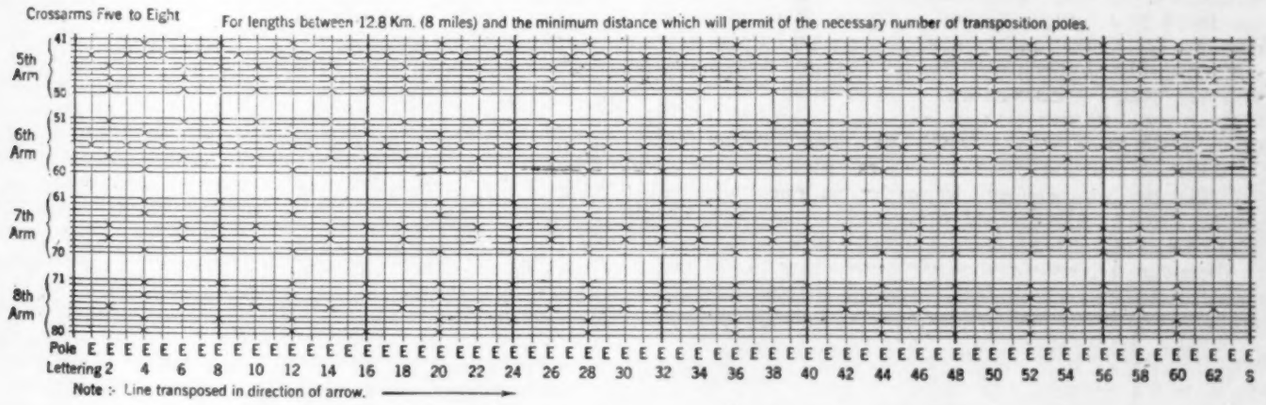

Crossarms Five to Eight
For lengths between 12.8 Km. (8 miles) and the minimum distance which will permit of the necessary number of transposition poles.
5th Arm
41
50
6th Arm
51
60
7th Arm
61
70
8th Arm
71
80
Pole
Lettering
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 S
Note :- Line transposed in direction of arrow.

Fig. 7.—E Section—Transposition System for Non-Phantomed Circuits on Exposed Telephone Lines.

As a chief requirement of the exposed-line system was that it should provide a maximum possible flexibility in the location of transpositions in parallel three-phase power circuits, this was made a matter of most careful study. The results obtained are outlined in the description of the system given in the next section of this paper.

(To be continued.)

European Telephone Practice

Translations from the Foreign Press and Communications from European Engineers

BY FRED W. SCHOLZ

THE TELEPHONE SERVICE OF BERLIN.—A short time before the outbreak of the war a French commission visited the different countries of Europe and made a study of the telegraph and telephone systems in them and reported their findings back to their own governments. Among these investigations was one headed by Monsieur Drouet, whose duty it was to make a study of the telephone system of Germany. His report entitled "Le Telephone en Allemagne" was published a short time after he had finished his investigation in the *Annales des Telegraphes et Telephones* and is reproduced in part in the following article. There are two sections to M. Drouet's report; the one treats the advance of the automatic and semi-automatic telephone systems, fairly strong in Central and Southern Germany, and the other restricts itself to a study of the telephone system of Berlin.

It can be said right at the very start that the telephone service of Berlin, and the same is true of most of German cities, is to our American eyes way behind the times and antiquated. The telephone is a government undertaking in Germany and improvements take place very slowly, for the bureaucratic system is so strongly intrenched that it takes a very long time before the machinery of the department works up enough speed to adopt a new type of apparatus and a new principle.

The telephonic system of Berlin, besides the city of Berlin itself, properly speaking, serves some 2½ million inhabitants as also a number of outlying suburbs that are from 2 to 5 miles distant from the business section of the city. The system includes 9 principal exchanges with common battery service in Berlin itself and 15 smaller branch exchanges with local battery service in the surrounding districts and suburbs, the largest number of subscribers served by a local exchange being about 1200.

The more important sections have direct trunk connections with each of the main telephone exchanges, while those with little traffic are connected direct only to the nearest larger exchange. According to the most recent statistics (i. e. before the war) Berlin alone had:

Main trunk connections	72,343
Other subscribers telephones and public telephone booths	54,616
Private lines having their own switchboards, but connected to the public telephone system	12,479

The ratio of trunk connections for subscribers with unlimited local service paying a determined rate for calls to subscribers receiving message rate service was as 7 to 3. When we include the suburban service into the figures we have:

Subscribers direct trunk connections	110,688
Private wires and public telephone booths	78,548
Private branch interoffice service	15,366

The exchanges in the outer districts and the suburbs are as yet not equipped with common battery service. Moreover except for five of the very recent exchanges, the old system of double call by subscriber, using an A- and a B-operator is still used.

Exchange Equipment: The different multiple boards are of different construction and of varying systems. The author merely gives the details of one of the most recent exchanges, which has been in service three years. It is in the same building with the Post Office and the Telegraph Bureau and separated from them by a corridor. The building has three stories and the top story is used by the exchange telephone manager for living quarters. This building has two multiple swithboards, each holding about 10,000 lines. One of these has the entire number of subscribers connected, while the other has only 3000 connected. One hundred seventy-seven telephone operators are stationed in the single large room. The make-up of the two multiple switchboards is as follows: No. 1 has 86 groups *A*, non-multiple and 47 group *B*, of which 39 are in service. No. 2 has 27 groups *A*, non-multiple and 17 groups *B*, of which 10 are in service. The two multiple units are of the same construction with common battery system.

Composition of Group A: The outgoing lines are in multiple in groups of two and two in the ratio of 2x690 for two neighboring groups. The sections are arranged for 30 lines and each operator can have at her disposal for the same exchange as many as 4 order wire buttons as well as the 4 sections of corresponding outgoing wires. This proceeding which permits a fairly good distribution of incoming and outgoing telephone traffic is used a great deal on the Continent. But to give good results, the operators must be well trained and well disciplined. So far it has not been tried out in Paris.

Each group *A* disposes over 20 pairs of cords and serves 80 bulk rate subscribers or 200 message rate subscribers. The same group never serves at the same time the two groups of subscribers. The service is very lax on the message rate lines owing to the absence of mechanical recording apparatus. The operator has to note down each call on a paper, following out the disposition of the call lamps in her own group. Co-operation between the different operators is therefore very hard. Counters were to be installed shortly before the war, but whether they have been installed is not known. There is no question that their use would ease the work of the operators and increase their working capacity.

Composition of Group B: Multiple connection of subscribers lines is here made in groups of two and two. This disposition has been adopted to facilitate the service of the operators. But the result is a far greater development of the field panel of jacks to be served. The height of the multiple board has been increased and the operators are obliged to rise frequently to make connection. A footrail running along the length of the switchboard helps quite a little, but even at that this frequent rising is a nuisance and hinders more rapid service.

Calls are made merely by inserting the plug in the jacks and each group is provided with 30 single cords. In the case of service by the double call method in the older exchanges only 25 cords are in use. By using a special key the operator can reinforce or diminish the intensity of the testing of a line for busy signal. But the operators do not make use of this feature.

Accessories: No special tables are provided for the

supervisors. Each of them remains about the room to watch the 14 operators of her section. Control over the operators is carried out by a manager, assisted by a woman supervissor. The former has a control table, provided with a listening jack, a pilot call lamp and a pilot listening lamp, which is lighted by using any of the listening keys assigned to the various operators. The manager never speaks directly to the operators over the wire in regard to service. There is a general control service, including all of the exchanges, lodged in the main telephone building which also includes the training school.

Information service is given during the high peak traffic hours by 3 operators, to whom are sent all calls for information. Complaints are received at the manager's table.

Service of Personnel: The telephone operators are recruited as the result of a competitive examination in composition, dictation, arithmetic, geography. Applicants must be between the ages of 18 and 30, must be of certain weight and health and unmarried. Married women are excluded, or were so before the war. After 3 months instruction at the training school, the students have to pass another examination which decides their professional value and tests their knowledge of rules. The salary of students is about 70 cents a day (values of the mark before the war being fairly high), and finished operators receive from 1100 to 1800 mark a year ($275-450). Translated into our own values, this would be about equivalent to salaries of $900 to $1500. To this must be added 480 mark a year ($120) allowance for rooms for out-of-town girls. In case of marriage an employee is retired and has a right to a retiring pension. When an operator is incapacitated for further telephone service either through old age or through illness, she is transferred to the clerical department or to the Post Office.

Each operator gives 42 hours of service a week. The daily rest periods are taken either at one time or else in two or three relays, depending on the physical need of the operator. A minimum time period of 4 hours work is provided for between rest periods. In hours of heavy traffic 20 minutes are allowed for recuperation. An operator furnishes the following work on the average: 1. Position *A:* (80 bulk rate subscribers) in six hours: 813 connections; during the busiest hour: 200-240 connections. 2. Position *A* (200 message rate subscribers) in six hours: 288 connections with notes made of calls; during the busiest hour: 90-96 calls. 3. Position *B* with conversation line: 30 monocords. During the busiest hour: 500 connections; average during the day: 300 connections per hour. 4. Position *B* with double call (25 monocords): During the busiest hour: 350 connections.

Supervisors: Each of these is responsible for a number of operators ranging from 14 to 18. They have no special work table and stay for the most of the time by the side of the operators under their charge.

Mechanics: For an exchange of 10,000 lines a force of 6 mechanics is thought to be sufficient. Three of these are always present in the exchange and each gives 48 hours service per week. They need do no service during the night. They are appointed without examination, but they must prove that they have served in another exchange or in the telephone industry line for at least four years as repair and trouble men. Their assistants are men who locate trouble in the local exchanges and these also take care of the night service. One hour of night service is considered equivalent to 1½ hours of day service. The mechanics receive from 1500 to 2500 mark a year ($375-625) a year and are allowed $120 for lodgings in Berlin. A principal exchange like that of "Nord," having 10,000 subscribers lines has the following working staff: 1 director, 1 inspector, 3 private secretaries, 4 general secretaries, 375 operators and supervisors, 56 troublemen for the telephone call stations and the subscribers' instruments, 6 mechanics.

Interurban Exchange in Berlin: The long distance telephone exchange comprises 280 equipped positions. It serves 340 circuits in the ratio of 1 to 3 per telephone operator, the average running near 1, 5. The calls are shunted as they come in to 40 first operators, who make note of them and then send them on to the second operators. The communication between these two types of operators is carried on through pneumatic tubes, similar to those in use in the Paris principal exchange. The service rendered by the first operators is only 1 call ticket per minute, owing to the fact that the operator has to fill in the name and address of the subscriber asking for long distance and his own number as well as the long distance number wanted. This complex service slows down the capacity of the individual operator. The interurban switchboards, as the long distance switchboards are called abroad, have at their disposal subscribers' telephone lines and direct trunks connecting with each of the 9 main exchanges in the city. The connection with the 15 minor exchanges is made by means of auxiliary lines that connect with similar lines at the main exchanges. Communications between switchboards within the long distance exchange are made by a special connecting plug and listening key. Requests for long distance information are received by a distinct operator, who fills out a slip and sends it to a separate information operator. The latter looks up the information and then calls the subscriber and gives him the information. All of the circuits are overhead, even close to the exchange. To protect the exchange and the operators against atmospheric discharges, the exchanges are provided with 1 safety fuse of 8 amperes, a vacuum carbon lightning arrester, a lightning rod and a heating coil. The operators are protected by a special lightning protector, which short circuits the operator's position by means of an imperfect contact produced by the friction of two metallic springs by way of a rotating disc in an oil bath. All shocks and disagreeable head noises in the receivers are avoided and the operator is fully protected in case of thunderstorms.

Aluminum Connector Sleeves

According to the "Zeitschrift des Vereines deutscher Ingenieure," aluminum sleeves are being utilized on the Austrian telegraph systems for the connection of iron wires, the intention being to avoid using solder, which is very scarce, as well as to save time. Copper sleeves were formerly employed, but are now difficult to obtain. The sleeves are said to withstand the effect of corrosion very well, although electrolytic effects have been noticed. The results are sufficiently hopeful to render it likely that the same method will shortly be applied to transmission lines.

Stamp, stamp, stamp, your country's calling,
Step up, ladies, hear the cry.
Buy some stamps and win the war,
That is what your money's for,
And you'll get it back with interest by and by
—*Mountain States Monitor.*

Union N. Bethell

In a recent issue of the Montclair *Times* that newspaper quoted portions of Colenel Carty's speech, in which credit was given to Mr. Bethell and the Bell system in connection with the organization and work of the Signal Reserve Corps under Major General George O. Squier, chief signal officer of the United States army, and said:

The generous praise which Governor Edge in his recent address bestowed upon U. N. Bethell, of Montclair, for his services to the State of New Jersey was the first knowledge many of our citizens had that Mr. Bethell was engaged upon the reorganization of the various State departments and institutions, which has been one of the Governor's most distinguished achievements. Governor Edge had pledged himself when elected to give the State a business-like, economical, and efficient administration, and he took great pleasure, he said in his speech, in publicly thanking Mr. Bethell in his home town for the advice, co-operation, and assistance he had given so ably in bringing about this result.

Mr. Bethell's civic activities cover many years, as president of the Board of Education and of the Playground Commission, as a member of the Liberty Loan, Red Cross, and other committees, and in all other movements in the interests of Montclair.

His fellow-townsmen will be equally pleased to learn, in addition to his services to Montclair and to New Jersey, of what has been termed his "generous, far-sighted, and patriotic action" as senior vice-president of the American Telephone and Telegraph Company, in rendering invaluable service to the nation in winning the war.

Klaxon Horn on Telephone

A telephone that says "honk honk" instead of "ting-a-ling" is the unique but valuable device invented by C. M. Allen for fire prevention work in the national forests. Mr. Allen is telephone engineer in the office of District Forester Cecil, Portland, Ore. His invention promises to be a great asset in forest service work, as it makes possible the calling to the telephone of persons who may be a considerable distance from the instrument.

The device consists of an ordinary Klaxon horn operated by a combination of special relays adjusted so that a direct current connection will produce the loud alarm on the horn. The energy to operate the relays is furnished by a special magneto which delivers either direct or alternating current, thus making it possible to use the ordinary ringing signal or the loud-sounding alarm at will. Six cells of dry batteries are connected to the horn.

The horn is mounted with a regular telephone transmitter and receiver in a wooden case which protects the outfit when not in use. The batteries which operate the horn also furnish the energy for talking, and make it possible, by the use of a special induction coil and interrupter, to call distant stations that are equipped with the standard forest service howler. This coil and interrupter also make it possible to send signals over a line that is in bad condition due to fire or windfalls. While testing the apparatus, Mr. Allen successfully sent signals across a 100-foot gap in the wires.

This special telephone equipment was devised primarily for use in the fire protective work of the Forest Service. Fire guards provided with such a phone may be engaged in trail or bridge work at some distance from their camp and still be within telephone call in case of fire or other emergency requiring their attention. Forest officers have long felt the need of an efficient signaling instrument of this sort. Numerous suggestions for devices to meet this need have been made from time to time, but none have proved as practicable or efficient as Mr. Allen's invention promises to be.

The loud-sounding signaling set as devised by Mr. Allen will make a very valuable addition to the fire-prevention equipment of the service, according to forestry officials. In a test recently made on the Snoqualmie National Forest, the signal was heard a distance of two miles. A half dozen of the instruments have been constructed and put into use, and more will be added as fast as their efficiency justifies.

Induction from Alternating Current Railroads

Presented at a Section Meeting of the A. I. E. E. at Philadelphia—Concluded from September

BY H. S. WARREN

INVESTIGATIONS AND EXPERIMENTS. — Since 1905, when first notified of the intention to install single phase electrification on a section of the New York, New Haven and Hartford Railroad, the American Telephone and Telegraph Company has done a large amount of work on plans, tests, experiments and studies of various kinds, most of it in conjunction with representatives of railroads and the electrical manufacturing companies, all with the general object of finding means for protecting the telephone and telegraph lines and service against interference from electrification installations. A considerable amount of work has been done in connection with various electrification projects which have not been installed, some of these projects having been abandoned, at least in so far as the specific plans under consideration are concerned, while in other cases the matter is being held in abeyance, awaiting more favorable conditions for undertaking construction.

MEANS FOR PREVENTING INTERFERENCE FROM ALTERNATING CURRENT RAILWAY ELECTRIFICATIONS

There are various means which have been proposed, some applicable to the railway system and some applicable to the affected communication systems, for preventing or reducing inductive interferences. Some of these means have not been found successful or advantageous in practice while others have proved beneficial in varying degrees. It will be of interest to consider briefly some of these proposals.

Separation. The most effective means is to avoid the parallel, wherever practicable, by keeping the communication circuits and electrified railroads sufficiently separated. With the extension of electric traction, and the constantly increasing importance and efficiency of communication circuits, the avoidance of parallels will be increasingly important. However, this first rule for preventing interference, is unfortunately, not one which can be generally adopted in practice. Railroads and communication circuits must serve the same communities and it is necessary that the connecting routes of each be reasonably straight and direct. The field of influence of an alternating-current railroad which uses the running rails as a part of its circuit extends out to a great distance on both sides of the railroad. This makes effective separation from such electrified railroads much more difficult than separation from most other kinds of power transmission circuits.

Neutralizing Transformers. Where communication circuits are subject, under normal operating conditions of the railroad, to induced voltages sufficient to interfere with telegraph service, neutralizing transformers can be resorted to and if properly designed and connected into the disturbed circuits, such transformers will effect neutralization of a large part of the induced voltage. The transformers are provided with a plurality of windings, some of which, called primaries, are inserted in certain of the affected conductors which are grounded at or beyond the limits of the parallel, while the remaining, or secondary windings, are connected serially into other of the conductors in which the induced voltages are to be neutralized. Under favorable conditions the remaining, non-neutralized voltage, is only 5 to 10 per cent of the total induced voltage.

For a more complete description and discussion of neutralizing transformers reference is made to an article by Thomas Shaw in the *Electric Journal,* November, 1914.

Neutralizing transformers, however, have serious disadvantages from the telephone company's standpoint. The primary circuits, of which there are ordinarily from one-third to one-half the number of secondary circuits, are practically lost for telegraph purposes although they can be used for telephoning, at somewhat reduced efficiency. The secondary circuits are also reduced somewhat in telephonic transmission efficiency, but not so much so as the primaries.

Neutralizing transformers have served a useful purpose in the early stages of alternating current railroad electrification where means of restricting the railroad's field of inductive influence were not employed. They continue to have a limited field of usefulness, particularly in making endurable moderate amounts of induced voltages which remain after preventive methods have been applied at the source of disturbance, but they leave the general problem of interference unsolved. They are not applicable to subscribers' lines nor have they been found effective in neutralizing the higher harmonics which cause noise.

Drainage Coils. Drainage coils, bridged across a telephone line, with their mid-points connected to ground, provide a low impedance path for currents induced between wires and ground and thus tend to reduce the voltage. Such coils must be exceedingly well balanced or they will themselves constitute a source of unbalance and thus augment noise. Moreover, they increase the susceptibility to noise resulting from irregularities in series resistance or impedance of the telephone circuits. Also they impair telephonic transmission efficiency.

If telegraph service or direct-current signaling is employed on circuits equipped with drainage coils it is necessary to place condensers in series with the coils. The effect of this apparatus on telegraph service is distinctly detrimental.

Drainage coils have not proved to be adapted for general use on commercial systems but are helpful on private telephone circuits of power transmission companies for reducing high electrostatic charges when such private circuits are carried close to high-voltage wires.

Sectionalization of Telephone Circuit. An affected telephone circuit may be sectionalized by cutting in repeating coils at one or more points. This may be advantageous in certain cases of exposed rural lines where by placing a repeating coil at each end of a parallel it is possible to change to a metallic circuit through the parallel. It is also sometimes useful on private telephone circuits of power transmission companies as it makes possible the insulation of the telephone sets from the exposed telephone wires. On commercial telephone systems the usefulness of this method is very limited as it introduces large transmission losses, precludes the use of telegraph and brings in difficulties in connection with line signaling.

Shielding Conductor. A copper conductor used as a shield may be strung near the disturbed communication wires and grounded at the ends of the parallel. With a conductor of suitable impedance, the current carried by the conductor will have a neutralizing effect on the induced voltages in the near-by communication wires. The action is similar to that of neutralizing transformers but less effective. In case of an aerial cable, the cable sheath itself can be so used instead of a separate copper conductor. The benefits derivable from this method, however, are very limited.

With a view to increasing the neutralizing action of such a conductor, it has been suggested that a part of the railway current could be diverted into it. The quantitative relations involved are such, however, that great difficulties stand in the way of successful application of this scheme on a commercial scale.

Resonant Circuits. Combinations of coils and condensers, adjusted to be resonant at the disturbing frequency and connected so as to reduce the disturbing current in the receiving instruments, have been employed to some extent. These afford considerable benefit for low-speed telegraph service such as ordinary hand sending. For higher-speed operation, the benefit obtainable in this way becomes rapidly less. Many modern telegraph systems operate at speeds approaching 25 dots per second which makes it impossible to differentiate in this way between the signaling and disturbing currents.

Similar methods have been suggested for reducing noise but are not usually applicable because the harmonics which cause noise are within the range of frequencies required to give good telephonic quality.

Balance and Insulation of Telephone Circuits. It is advantageous to construct and maintain telephone circuits exposed to induction with a high degree of balance and insulation. This includes an adequate transposition system. In all cases of inductive disturbance care should be exercised that these features of the affected lines are properly attended to.

Use of Relay Sets. On direct telephone lines the bell is bridged between the two metallic conductors. On two-party selective lines one bell is connected between each side of the circuit and ground. On four-party semi-selective lines two bells are connected between each side of the circuit and ground. On four-party lines, with full selective ringing, the bells are not connected to ground except at times when an operator is ringing on the line and at such times the connection of the bell to ground is established by means of relays. On all these classes of lines both sides of the circuit are grounded at the central office.

It will thus be seen that an induced voltage between the circuit conductors and ground might ring all grounded bells, but under normal circumstances would not ring bells on a direct line or at stations equipped with relay sets. However, if the induced voltage is high enough to operate the telephone protectors, a path to ground is established through the protector, and bells on direct lines or bells at relay set stations may be falsely rung.

Biasing Bells. In regions where the induced voltages are not too high, false bell ringing can be obviated by biasing the bells, that is, by stiffening the control springs so that increased voltage is required to ring the bells. Obviously, there are very positive limitations to

the relief that can be accomplished in this manner.

Measures Applicable to Railroads. The foregoing measures for obviating inductive interference are of a palliative nature and assume a condition of the electrification which produces large inductive effects. Another class of measures for avoiding interference looks to the source of the disturbances, the electrical system of the railroad, and seeks to avoid the conditions which produce large induction. This latter class has, in general, the advantage of benefiting, not one affected circuit only, but all communication circuits within the area affected.

Double Trolley. One radical and probably effective method of preventing inductive interference from single-phase railroads would be the use of a double-trolley circuit completely insulated from ground, thus avoiding the use of the running rails as a part of the railway circuit. This method, however, is distinctly unpopular with railway men, mainly for operating reasons, on account of the complexity of the overhead construction particularly in yards, and at sidings and crossovers. Purely from the cost standpoint this method might have advantages in certain cases, where the conditions of exposure are severe and other methods of restricting the earth currents are expensive to apply.

Frequent Power Supply Stations. One of the most important methods of interference-prevention is the provision of a sufficient number of substations to supply power to the trolley-rail circuit at frequent intervals. If the substations are near enough together, the amount of stray current and the average length of path of such current can be made small. It is particularly desirable that all sections of electrified railroad which are involved in parallels be supplied with power from both directions rather than by stub end feed.

Sectionalization of Trolley System. Considerable advantage may be gained by sectionalizing the trolley, thus decreasing the length of the earth current path as well as reducing the amount of power supplied to a short circuit. However, as each separate section of trolley requires an independent power supply sufficient for its maximum demand, the total transformer capacity required for a given length of electrified road is much increased by any considerable use of trolley sectionalization. Notwithstanding this objection a limited amount of sectionalizing may be used to advantage where the exposure is severe.

Opposing Polarities. On railroad lines having two tracks it is possible to connect the two trolleys for opposing polarities, so that the current flowing in the rails and earth is only the difference in the currents of the two trolleys. An instance of this method applied to a direct current railroad is afforded by the City and South London Railway in England, which has been so operated for 20 years. As applied to alternating current railroads of 11,000 volts, this method is considered to have serious operating disadvantages in respect to cross-overs between tracks, and for this reason this plan, which was studied in connection with the revision of the Woodlawn-Stamford electrification of the New Haven Railroad in 1912, was not adopted.

Balancing Transformers. This method, which is now employed on the main line electrification of the New Haven Railroad, is of much benefit in reducing stray currents, particularly where power is supplied from both directions. Its use, however, involves a combined transmission-distributoin circuit, tied together by the balancing auto-transformers, whereas the general practice in such matters seems to tend toward a separate transmission line supplying power to the trolley-track circuit through standard transformers.

Booster Transformers. Another important method of controlling railroad currents is by the use of booster-transformers placed at intervals along the electrified section. These transformers have a substantially even ratio of transformation, the primary winding being inserted serially in the trolley, and the secondary winding inserted serially in the track circuit. In this way the track current is required to be substantially equal to the trolley current at points where the transformers are located. By placing the transformers near together the leakage of current into the earth between transformers is made small.

A modification of this plan is to install a feeder, electrically connected to the rails at intervals, and insert the secondaries of the booster-transformers in series with this feeder. In this way the current is confined to the feeder instead of the rails. The London, Brighton and South Coast Railway embodies an installation of this type. This arrangement is somewhat more effective perhaps than trolley-track transformers but it involves considerable additional expense for the feeder, which must be of high conductivity. One advantage of the feeder-booster, over the track-booster arrangement, is that successful operation of the former is not so dependent on high grade maintenance of the track bonding.

SPECIFIC ELECTRIFICATIONS.

Having now considered various means which are available, or at least worthy of being considered, for avoiding or reducing inductive interference to communication systems by alternating current electrified railroads, we may now direct our attention to some specific electrification installations and see what has actually been done to prevent such interference and with what degree of success. In so doing I will confine my remarks to the salient features of four single-phase installations: (1) New York, New Haven & Hartford Railroad, Woodlawn to Stamford; (2) New York, New Haven & Hartford Railroad, New Canaan Branch; (3) Norfolk & Western Railroad, Bluefield to Vivian, W. Va.; (4) Pennsylvania Railroad, Broad street to Paoli, Pa.

Woodlawn-Stamford. The original electric installation of the New York, New Haven & Hartford Railroad Company between Woodlawn, N. Y., and Stamford, Conn., began operation, in part, in the summer of 1907. This is a section of four-track railroad, about 21 miles in length, and all power was supplied by a generating station at Cos Cob about three miles west of Stamford. To move a train at Woodlawn, the current passed for 18 miles over the trolley wires and paralleling feeders from Cos Cob to the locomotive, the remainder of the circuits from locomotive to Cos Cob, being the running rails and earth. The telephone company's New York-Boston subway is, throughout this section, situated at varying separation averaging about 2,000 feet from the railroad, a sufficient distance so that the inductive effect of the trolley current would have been largely neutralized by the inductive effect of the rail current, had these two currents been equal. However, due to the long rail path, a large part of the current left the rail and spread into the earth, where its effect in neutralizing the corresponding part of the trolley current was negligible.

After full electric passenger service between Woodlawn and Stamford was inaugurated, the induced 25-cycle voltage on circuits in the New Haven subway, at normal rush hour periods, was as much as 170 volts. On the

Shore Line, one of the telephone company's open wire routes between New York and Boston, the corresponding induced voltage was about 300, the higher voltage on the Shore Line being principally accounted for by about a mile and a half of exposure near Greenwich, where the average separation was only about 100 feet. The open wire Shore Line circuits were also affected by noise, which was most intense during periods of train acceleration, the pitch of the noise varying with the speed of the train. The subway circuits being in metal-sheathed, underground cable, and not having any section of very close parallelism, were not made noisy. The Midland Line, another open wire route between New York and Boston, about four miles away from the railroad at the nearest parallel section, sustained corresponding induction of about 40 volts.

Wires of the Western Union Telegraph Company, which were carried on poles located on the railroad right of way, were subjected to much higher voltages. These wires, except a few which were equipped with neutralizing transformers and continued in use by the railroad company, were removed to a new pole line which was built a number of miles away.

The conditions as to induction continued substantially as outlined above for a period of four or five years.

Early in 1911 the railroad company made known its intention to extend the electrification to include the Harlem River branch and the New York, Westchester and Boston Railroad. The former is a six-track line used principally for freight, extending about 12 miles from its junction with the main line, near New Rochelle, to the Harlem River. The New York, Westchester and Boston Railroad, which is partly four-track and partly two-track, was constructed principally for suburban service and extends from West Farms at One Hundred and Seventy-sixth street, where it forms a junction with the Harlem River branch, to White Plains, a distance of 16 miles. A branch six miles north of West Farms taps the main line of the New Haven Railroad just east of New Rochelle. These two new lines involved the direct connection, to the western end of the previously electrified section, of additional electrified line to the extent of about 200 miles of single track railroad. Moreover, it was planned that, after the Harlem River branch was electrified, freight trains, as well as passenger trains, on the entire system west of Stamford should be operated electrically.

This proposed large extension of the electrification, with its resulting increase in load, caused considerable apprehension to us of the telephone company. Our estimates of induced voltages under the new conditions, based on the railroad company's estimates as to future train loads, indicated over 1,500 volts on the Shore Line and nearly 1,000 volts on the subway. These values corresponded to maximum normal railroad loads, and the induction would have been still greater at times of abnormal conditions. Voltages of this magnitude are far beyond the endurable limit for the telephone company and the matter was taken up by the companies with a view to determining what could be done to ameliorate the situation.

In January, 1912, a joint committee of engineers, comprising a representative each of the New Haven Railroad Company, the Western Union Telegraph Company, and the telephone company, was formed to study this question. Several different plans for modifying the railroad distribution system were laid before this committee. After six meetings during the ensuing three months a plan was decided upon and a sub-committee of engineers was designated to work out the details.

This new distribution system involved quite a comprehensive change in the original installation. It was cut over on January 15, 1914, and has been found to bring about a great improvement with respect to induction.

Besides an additional power supply station at West Farms, which in itself effects a considerable improvement, the new distribution system includes the use of 17 balancing autotransformers of 2,000 kv-a. capacity each. These are distributed along the line, in such locations as are most advantageous for supplying power to the trolley circuit, so as to minimize the length of path of current through the rails.

As full accounts of this distribution system have been published I will not undertake an extended description of it here.

The same system has been used by the railroad company in extending the electrification from Stamford to New Haven.

At present the induced voltages on the through circuits in the subway seldom exceed 30 volts under normal conditions of railroad operation.

The principal interference now incurred (apart from that due to the New Canaan Branch which is discussed elsewhere) is in connection with railroad short circuits in the vicinity of Stamford. Within the section from two miles west of Stamford to five miles east of Stamford, local subscribers' lines and trunk lines have been affected by false bell ringing, false flashing of line signals, and grounding of protectors, on about twenty different occasions in the past three years, an average of twenty lines being affected on each occasion. It is of interest to note that these troubles are localized within this seven-mile section of the sixty-mile electrification from Woodlawn to New Haven, and also that it is at approximately the middle of this seven-mile section that the New Canaan Branch, referred to immediately below, joins the main line.

New Canaan Branch. In 1907 the New Canaan Branch of the New Haven Railroad, which previously had been operated at 500 volts d. c., was reconstructed and its trolley connected directly to the 11,000-volt trolley on the main line near Stamford.

This branch is about six miles long, single track, and the traffic is light so that under normal conditions of operation no interference with telephone or telegraph lines was produced. However, the telephone circuits have been subjected to a great deal of interference from this branch, due to short circuits. Owing to the conditions of power supply, the short circuit current at New Canaan is about 2,500 amperes or ten times the maximum load current. At points nearer the main line the short circuit current is even greater.

The inductive effects of the New Canaan branch were augmented by the large proportion of earth current, due to the relatively high impedance of the single track. Momentarily voltages as high apparently as 1,000 were imposed on trunks between New Canaan and other places and voltages up to 500 on many telephone circuits in the New Canaan exchange. These induced voltages operated protectors, permanently grounded and put out of service many telephone lines and subjected operators to severe acoustic shocks. Due to the recurrence of these surges, the operators in the New Canaan office became so afraid of shocks that the operating efficiency was seriously impaired.

In 1913, after several unusually severe surges from short circuits had been experienced, the matter of finding some means to overcome this interference, which had already been under consideration by the telephone and railroad companies, was taken up with renewed energy. Various plans were proposed and an extended series of

experimental tests and measurements were made, as a result of which means were finally agreed upon as follows: 1. To keep the rails well bonded. 2. To insert a current-limiting reactance in the trolley, near its junction with the main line trolley, so as to restrict the short circuit current. 3. To install 12 series booster track-trolley transformers at intervals of about one-half mile. 4. Readjust the circuit-breaker, at the junction with the main line, for instantaneous operation.

From the tests and from experience with six booster transformers, it is believe that the above mentioned measures will be effective in preventing this interference although the full installation of transformers and the current limiting reactance has not yet been completed.

It is of interest to note that the balancing transformer plan, although generally giving good results on the main line of the New Haven Railroad, does not afford an effective means for proventing inductive interference under such conditions as exist on the New Canaan Branch.

Norfolk and Western Railroad Electrification. This electrified section is between Bluefield and Vivian, West Virginia, a distance of approximately 28 miles. The railroad is double track with numerous yards and sidings and includes some heavy grades. The power house for supplying power to the electrified section is located at Bluestone, about 10.8 miles west of Bluefield. Power is transmitted by duplicate single phase transmission lines at 44,000 volts by five substations, the distances between wihch, respectively, beginning at Bluefield, are 8.2, 4.6, 6.6 and 4.8 miles. At these substations the voltage is stepped down to 11,000 for delivery to the trolley-track circuit which is electrically continuous throughout from Bluefield to Vivian.

The original plans for this electrification were taken up with the telephone company who proposed some modifications for the better protection of the paralleling communication circuits. The plans as modified include 23 series booster trolley-track transformers, the average spacings of which are, east of the power house, about a mile and a half, and west of the power house about a mile. Each transformer is 100 kv-a. continuous rating and 400 kv-a. for 2½ minutes.

One telephone line paralleling this road has several exposures of about 500 feet separation from the railroad and there are also local circuits of the Bluefield Telephone Company in proximity to the railroad. No trouble has been reported from induction under normal railroad conditions. At times when the electrification wires are down noise has been experienced on some of the above mentioned circuits. Also a telephone trunk circuit which crosses the railroad underground is sometimes thrown out of service when the railroad circuit is in trouble, by reason of the copper block protectors at the crossing becoming grounded. Some trouble has been sustained from corrosion of lead cable sheaths at underground crossings of the railroad in Bluefield but it has not been established whether or not this is due to electrolysis by the alternating railroad currents.

Broad Street—Paoli. Plans for electrifying the Pennsylvania Railroad's four-track main line from Broad street to Paoli were announced early in 1913. The question of interference with the telephone company's lines was taken up with the engineers representing the railroad company and several plans looking to the prevention of interference were considered. As a result of the best information then available it was decided in 1914 to install series booster trolley-track transformers for the purpose of confining the current to the rails.

The power for this electrification is conveyed by a 44,000-volt 25-cycle transmission line to three substations, one each at West Philadelphia, Bryn Mawr and Paoli, and from these substations supplied to the trolley-track circuit at 11,000 volts. Sixteen pairs of trolley-track transformers, each transformer equipping two tracks and having a continuous rating of 80 kv-a. and 600- kv-a. for one minute, are provided, the spacing between transformers being about one mile.

The regular operation of electric passenger trains between Broad street and Paoli was begun during the latter part of September, 1915. Extended induction tests were made on the section east of Bryn Mawr in April, 1915, and on the entire line in the following August. Further induction tests were made in the summer of 1916.

In July, 1916, the Railroad Company commenced operating synchronous condensers at Radnor and it has been found that, with these condensers in use, the booster transformers are greatly overloaded at times of short-circuit. This results in the transformer iron becoming heavily saturated and the magnetizing current, consisting largely of the third harmonic, which under these conditions reaches very high values, necessarily flows through the ground. The current wave is badly distorted as a result of this overloading and the induced voltages during short-circuits may actually be higher with the booster-transformers than without them; in fact, it has been found preferable to remove the booster-transformers east of Bryn Mawr, and only those from Bryn Mawr west are now regularly in service.

With all booster transformers in service the maximum induced voltages (peak values)*, during normal operation are about 10 for subscribers' lines and 25 for trunk lines; at times of short circuit, calculations based upon experimental data show that the maximum voltages may exceed 1,000 on subscribers' lines and 1,200 on trunk lines. With all booster transformers cut out, the corresponding figures are, for normal operation, 50 volts for subscribers' lines and 125 volts for trunks and, at times of short circuit, 225 volts for subscribers' lines and 900 volts for trunks. These figures assume two condensers in service.

This section of railroad follows through a highly developed suburban area where disturbances on telephone lines are extremely undesirable. Unfortunately, a considerable number of cases of bell ringing due to short-circuits on the railroad circuit have been experienced. Not all short-circuits cause bell ringing however.

During the first three months of electric operation, namely, October, November and December, 1915, the number of short-circuits causing bell ringing averaged 10 per month and the bell ringing troubles over 2,000 per month. During the following seven months the average number of short circuits causing bell ringing, fell to 4.5 per month and the bell ringing troubles from 735 in January to 57 in July. Since July, 1916, the number of short-circuits per month which caused bell ringing have been further reduced and during the year 1917 averaged about 1.5 per month.

The improvements in the bell ringing situation after January, 1916, and up to August, 1916, was due partly to changes in the railway control circuits and in the operating arrangement of circuit breakers, and partly to the substitution of relay sets for standard party line bells, at subscribers' stations within the regions of heaviest inductive disturbances, and the biasing of bells within the areas of

*On account of the wave shape distortion described above, it was found advantageous here to measure peak voltages rather than effective voltages and all values of voltage mentioned in this discussion of the Paoli electrification are peak values.

less disturbances. This work required changes in subscribers' apparatus at about 3,000 stations.

The synchronous condensers installed in the latter part of July, 1916, increased the maximum voltages impressed on the telephone circuits at times of short-circuit on the railroad, so that while the actual number of short circuits causing bell ringing has been reduced since that date, the average number of bell ringing troubles per month has increased. From August, 1916, to December, 1917, inclusive, there were 22 short circuits causing bell ringing and 1,589 bell ringing troubles, an average of 72; whereas for the five months' period preceding the installation of the synchronous condensers, there were 20 short circuits causing bell ringing, and 356 bell ringing troubles, an average of 18, or one-quarter of the corresponding average number in the later period. During the year 1917, 45 per cent of the bells rung were on direct lines and not grounded.

The high induced voltages causing bell ringing have been experienced over the entire electrified portion of the Main Line except within about three miles of Broad street. It is fortunate that the region of high induced voltages does not extend to Broad street, otherwise, owing to the density of telephone development within that district the trouble would be exceedingly difficult to cope with.

In a small percentage of cases where bells are rung the induced voltages are sufficient to leave the telephone lines grounded through the protectors, thus interrupting service.

Methods of signaling on call circuit trunks involving use of the ground have had to be abandoned.

Noise tests made on ten trunks which parallel the electrification indicate that the induced currents from the railroad cause a small amount of noise but not enough to constitute interference with service on these comparatively short lines. However, I may mention the fact that in the construction of the new Philadelphia-Reading toll cable, in which the requirements as to freedom from noise are more exacting than in the case of the shorter Main Line trunks, the liability of noise, together with other features of interference, was considered a sufficient reason for changing to a different route in order to avoid exposure to the electrified section of the railroad. The route adopted involves charges of $1,000 a year more than the route exposed to the electrification, which otherwise would have been followed.

None of the telephone company's circuits affected by the electrification are now used for telegraphy, hence there has been no interference with this type of service. It is expected, however, that telegraph service over the paralleling toll circuits will be required later and to give this service it will be necessary, unless there is some new development, to employ neutralizing transformers with their attendant disadvantages and limitations.

The high voltages induced on the telephone lines at times of short-circuits, also, in the opinion of the telephone company, constitute a considerable fire hazard, although it is fortunately true that no fires have as yet been caused. All terminating trunks at the three directly exposed offices west of Bryn Mawr have been provided with carbon block and heat coil protection. As these trunks are in underground cable, they would not require these protective devices except for the induced voltages. As an additional precaution against fire the telephone company has maintained a special force of night watchmen at several central offices throughout this area where regularly there are no inside men at night, thereby incurring an expense of about $18,000 per year. As a still further precaution, trunks to certain offices west of Malvern were for a time provided with repeating coils at Malvern, but it has recently been necessary to phantom these circuits, which has required the removal of the repeating coils.

A large number of the trunks affected by induction from this electrification are equipped with loading coils. Tests on these coils show that more than 20 per cent of them are magnetized to a greater or less extent but it has not yet been determined whether this trouble has been brought about wholly or in part by induced currents from the railroad circuits or whether it is due to other causes.

Within the area of high induced potentials, telephone subscribers and employees are exposed to the possibility of electric shocks at times of short circuit on the railroad. Fortunately, however, no troubles from such shocks have yet transpired.

Telephone operators and users are also exposed to the possibility of acoustic shocks at times of surges from short circuits, although no serious acoustic shocks, due to this electrification, have been reported.

It will be seen from the foregoing that, notwithstanding all that has been done by the railroad company and the telephone company to reduce interference, there still remain, at times of short circuits, certain hazards of fire and shocks, bell ringing trouble, and other latent interference as described. While this impending interference has not, with the exception of bell ringing, actually materialized into trouble, nevertheless the possibility of such trouble is continually present and the conditions can by no means be regarded as satisfactory.

Looking to further improvement in the situation a number of plans which involve changes in the distribution system of the railroad, have been worked out. The plan which, on the whole, seems entitled to the most favorable regard, involves the installation of additional power supply transformers at Radnor and at a point 16½ miles from Broad street, and also includes the sectionalizing of the trolley at both these points. This plan further requires the moving of the Berwyn-Malvern aerial telephone cable to a more remote location. By the adoption of this plan it is estimated that the maximum induced voltage at times of short-circuits would be brought down to 250. This would largely reduce, but not wholly avoid, the fire and shock hazards, bell ringing on direct lines, and the other evils involving the operation of protectors. The cost of carrying out this plan, including labor and material only, has been estimated at $140,000.

Another plan, involving more extensive changes in the power supply and distribution system to avoid wholly the interference and hazard, would require a much larger expenditure and perhaps would not be warranted by the existing situation.

A different plan would be to install sufficient additional booster-transformers so that they would not become overloaded at times of short circuits. This would probably require placing the boosters one-third to one-half mile apart and would cost from $85,000 to $150,000. This plan has not been worked out in detail, as the railroad company objects to the introduction of insulating joints in the trolley wires at such frequent intervals.

CONCLUSION

It may be said in conclusion that means are now known whereby alternating railway currents can be kept sufficiently within control, except under abnormal conditions, to prevent substantial interference to neighboring communication lines, although the application of such means to the extent necessary to produce satisfactory results may involve considerable expense.

Even under abnormal conditions the interference can be greatly reduced by the application of suitable measures, but in some cases there still remains the problem of obtaining a sufficient reduction of interference without incurring a cost which the railroad companies consider excessive.

It is important in each electrification project that the railroad company and the communication companies affected co-operate in determining what interference-preventive measures shall be adopted. Each electrification requires a special study, as the best measures to employ may be quite different in different cases.

I wish to take this opportunity to testify to the broad minded and cordial manner in which the railroad companies and electrical manufacturers concerned have co-operated with us in searching for a satisfactory solution of this problem, a work which, it is probably unnecessary to add, is still in progress.

Copper

At a meeting of the producers and the War Industries Board, August 7, it was agreed to continue the price of $26.00 for copper, as set by the board July 2, to November 1. It was also announced that producers would be allowed to sell at the price ruling at date of shipment, instead of the price at time of sale.

Worries of Telephone Men

Caterpillars and telephones have not much connection, but when a nest of caterpillars connects with a drop-line telephone connection, then there is something of a connection, says *Telephone Talk* of British Columbia. Anyway, R. W. Pindar, division plant superintendent, has his own story to tell of how these animals brought about a case of trouble, and if you don't believe it, ask Charlie McCullough, district salesman.

In the Bayview district, a nest of caterpillars was located on a tree branch, and, as it drooped with the increasing weight, the home of the wooly inhabitants had contact with drop-line connection into a residence. The way we got the story is that the caterpillars increased so much in avoirdupois that they weighted down the telephone line, which finally broke. There have been such stories about what the caterpillars have eaten that at first we thought we were going to hear that they had resorted to insulation and copper wire to stay the pangs of hunger.

On the subject of caterpillars' appetites, however, Mr. McCullough will tell you something. He has been following war-time advice and has gone into gardening with a vim. Working early and late, he had got quite a nice collection of vines and things, when the caterpillars came out of the neighboring trees, and—well, you should hear him tell of what they left, or rather, what they didn't leave. During the daylight-saving hours of evening he and his toiled picking caterpillars, just like we used to pick potato bugs in the long ago, and then up in the morning with the lark they started in again—that is, the people started in to pick caterpillars, who had already started in; in fact, Mac says they never stopped.

Caterpillars are a great pest in the vicinity of Victoria this year, and these stories would indicate that in some parts of the lower mainland they are an active destructive agent.

Woodpeckers, too. In North Vancouver, one of these long-billed feathered inhabitants of the grove discovered an underground box on a pole—sounds rather anomalous, but it's right—and as it sounded hollow, the woodpecker proceeded to tap the box. Instead of juicy insects, it found telephone wires inside, with a modicum of "juice."

After all, this matter of eating is the big problem.

Municipal System for Barranquilla

The municipal council of Barranquilla, Colombia, has just promulgated a decree by which it is proposed to form a joint-stock corporation to construct and operate a new telephone system in Barranquilla.

The telephone concession of the present operating company expired about three years ago, but the company is still operating. The service is antiquated and the system is operated far beyond its ordinary capacity.

Although previous efforts have been made to establish a new system, they fell through on account of opposition and adverse propaganda. The present project, however, is the first one proposed by the municipality itself and stands an excellent chance of being put through as the terms of subscription for stock are very reasonable.

The outstanding features of the present proposition are the following:

A stock company to be organized with a capital of $100,000, Colombian currency (at present the Colombian dollar is worth $1.18 American currency), divided into 10,000 shares of $10 each, of which the municipality will subscribe 4,500 shares, or $45,000, thus giving it control of the company. The stock will be paid for as follows: Twenty per cent initial payment, the balance to be paid in amounts to be determined by the board of directors, but in no case to be less than $1 monthly. Ten per cent of the net profits will be placed to the reserve fund every six months. The loss of 50 per cent of the capital will result in automatic termination of the enterprise. No individual stockholder, except the municipality, may hold more than 150 shares. Fifteen years after commencing operations the municipality will have the right to buy up the total outstanding shares, paying their par value plus 10 per cent. If during this 15-year period the dividends do not amount to 12 per cent of the invested capital the municipality will pay, from the reserve fund, aside from the par value plus 10 per cent, the difference necessary to bring the total dividends up to 12 per cent annual. Any excess of dividends over 12 per cent annual, after deducting the 10 per cent net profit reserve, will belong to the municipality.

There are at present about 500 telephones in the city which pay a flat rate of $4.50 per month.

Dominican Telephone Systems

The towns of Moca, La Vega, La Romana, Salcedo, Monte Cristi, Puerto Plata, San Pedro de Macoris, San Francisco de Macoris and Santiago de los Caballeros have local telephone systems owned by companies or private individuals. These towns have an average of 100 telephones each.

The prevailing rate for telephone service is $3 a month, the limit fixed by the government. The cost of branch lines is $1.50 per month, and there is usually a considerable reduction in both of these rates if paid for a year in advance by the subscribers. The telephones are operated from 6 a. m. until 10 p. m., and for the rates charged there is no limit to the number of messages that may be transmitted. In most instances the local telephone systems are well administered and are profitable.

BY HERBERT S. HOUSTON

Member of the Chamber of Commerce of the U. S. A. on Economic Results of the War

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Chapter XII—Removing the Causes of War

THE causes of war are often commercial. And there is good ground for the view that the causes of war must be removed, or at least greatly reduced, if there is to be a just and durable peace in the world. For international courts will avail little, it is strongly urged by some, unless the danger of war is overcome. Of course, the quick and manifest rejoinder is, to a criticism so superficial, that just as courts within nations are not set up to remove the causes of crime but to punish criimnals, so international courts would be established, not to remove all causes of war but to settle the disputes between nations that might lead to war. Still there is a deep-seated feeling in the world that wars will recur, in some way, unless they can be controlled at their source.

The business men of the world admit at once that the international trade in which they engage, has been in the past and will continue to be a possible cause of war. And they are prepared to propose a plan that will work directly toward controlling that cause even if it can scarcely be hoped to remove it wholly. And the plan is this—let the international chamber of commerce, which had been making steady and strong progress in the ten years before the war, be developed into a powerful agency for developing and distributing the commercial opinion of the world, on all questions of international trade that might carry witin them the seeds of future wars. For example, the congress of the international chamber held a largely attended session in Paris in the summer of 1914, shortly before the war broke, and decided to begin a plan to determine by referendum—a plan that has proved to be so highly successful with the Chamber of Commerce of the United States—the opinion of the business men of the world on various matters affecting international trade. In fact, it was decided to submit a definite referendum as to what constituted disloyal or unfair competition between nations in international trade, but war was hard on the heels of the congress and the referendum was never taken. But this plan, which was agreed upon before the war, should be put into operation when the war is over. There can be little reason to doubt that in the light of knowledge, which friendly discussion would throw upon disputed questions of trade, adjustment and conciliation would often result. This would be meeting the possible trade causes of war in constructive fashion, in a spirit of accommodation, and many of them would be settled. As Edward A. Filene of Boston said before the War Convention of the Chamber of Commerce of the United States, "There is no real reason why nations should spend valuable energy in blocking and hampering each other. There is business enough in the world to satisfy the rightful ambition of all peoples." And he gave this clear challenge of international business, broadening through the centuries into a co-ordinated unity, "Whether we think in terms of the business welfare of our own particular nations alone, or in terms of the general progress and stability of the world, this much is clear: It will not do to leave to traditional diplomacy and to ever-changing cabinets and governments alone the handling of those business difficulties which will menace the successful conduct of international trade and threaten the durable peace of the world."

In order that international business difficulties might not be left to governments alone, through sheer lack of effective means for bringing to bear upon them the collective business judgment of the world, the Chamber of Commerce of the United States has appointed a committee "to make a study of the question of the reconvening of the International Congress of Chambers of Commerce at the earliest time that is judged expedient."

It is not improbable that an international chamber of commerce might become an essential factor in the proposed league of nations. In some countries the chambers of commerce have official status and connection with their respective governments. And whether they had such connection or not they could become a powerful agency for mobilizing good will among the nations, by the accepted give-and-take spirit of business, by developing an established policy of fair dealing, under which trade discriminations would disappear, and by consciously weaving bands of commerce into bonds of peace.

Such an international organization as part of a league of nations would serve two great purposes—it would constantly work toward the removal of the commercial causes of war, and it would work definitely, if war was impending for political or any other cause, toward the quick and effective use of economic pressure against a nation that refused to take its case for judgment to the World Court. Centuries ago these two purposes were served by a strong commercial organization, that of the Hanseatic League. The trading cities in this League flourished through generations, held together by the common bond of commercial self-interest. They become so powerful that they steadily gained trading rights and privileges, even against the opposition of governments and rulers. And it is interesting to be reminded by the Anglo-American merchant, H. Gordon Selfridge, in his recent book, "The Romance of Business," that a member city that broke trade laws and rules of the League was punished by having the rights and privileges of the League withdrawn. For example, Bremen in 1356 was expelled from the League because she failed to punish one of her merchants who had broken a rule of the League in regard to trading with Flanders, and for thirty years she suffered the loss of trade advantages—suffered from economic pressure. At another time Brunswick came under the ban because of delinquency and for six years suffered such great loss of trade that her people were brought to poverty. And before the ban was raised two burgomasters and eight important citizens of Brunswick went to Lubeck, the head city of the League, offered abject confession of wrong-doing and craved for pardon in bare feet and on bended knee. And the League used economic pressure not only on one of its members but even against a strong outside nation. So powerful a monarch as Henry IV of England was forced to meet the demands of the League, largely through an embargo by which it closed the Baltic ports to English commerce. While the power of the League waned as the power of nations grew, three of the old Hanse

cities, Lubeck, Hamburg and Bremen, were enabled, by the treaty of Westphalia in 1648, to retain certain privileges as "free cities" and these were continued until so recent a time as 1888, when Bismarck finally forced their surrender.

This historical example, although not applicable to the international conditions that will follow the war, at least serves the point of showing how strong the bond of commerce is and how effective economic pressure can be made. An international chamber of commerce, with all the facilities for securing united action now available and with the authority of a league of nations behind it, could be expected to do much toward removing the causes of war, as well as toward making a league of nations so strong in its economic power that wars which threatened could in many cases be blocked and wars which started, in other cases, could be stopped; and, if the last ditch was reached, and armed force was required to overcome a recalcitrant nation, such an organization would greatly strengthen military power by mobilizing, in support of it, the industry and commerce of the law-abiding nations. Against such combined military and economic might, arrayed in defense of international law, any nation would have to strike its colors.

Chapter XIII—The Bible Warrant for a League of Nations

DR. LYMAN ABBOTT, both seer and editor, has seldom used his great gifts of interpretation in a more illuminating way than in one of his Knoll papers, published in the *Outlook* in September, 1917, under the heading, "Christ's League to Enforce Peace." With Dr. Abbott's permission, this paper is published here as a chapter of this book. It gives a biblical background to the League of Nations programme which had not been presented until it became a subject for the gifted pen of Dr. Abbott. The article is as follows:

"Jesus Christ compared his words to seeds. They are the expressions of a spirit which inspires life, and of the principles which guide that life in right channels. They are not rules to regulate conduct. If 'Lay not up for yourselves treasures upon earth, where moth and rust doth corrupt, and where thieves break through and steal,' were a mere rule to regulate conduct, it would be a sufficient compliance to provide cedar chests for our clothes and a safe deposit box for our money. They are not substitutes for thought, they are incentives to thinking. As seeds they were intended to be developed by his disciples and intelligently applied to the varying circumstances and conditions of an ever-varying life. This truth must be borne in mind by the reader, if he is to understand this paper.

"In the eighteenth chapter of Matthew are recorded certain principles which Christ recommended to his disciples for the settlement of any controversies which might arise among them. These principles are embodied in a rather specific prescription of the methods which he instructed them to pursue. These principles and methods appear to me to be as applicable to controversies between nations as between individuals. They are as follows:

"Moreover, if thy brother shall trespass against thee, go and tell him his fault between thee and him alone; if he shall hear thee, thou hast gained thy brother. But if he will not hear thee, then take with thee one or two more, that in the mouth of two or three witnesses every word may be established. And if he shall neglect to hear them, tell it unto the church; but if he neglects to hear the church, let him be unto thee as an heathen man and a publican."

"Two remarks must be made in explanation of this counsel.

"When the counsel was given the Church did not exist. The word here rendered 'Church' is one used throughout the Old Testament in the Greek version, current in Christ's time, to designate the popular assembly of the Hebrew people, a body half-way between a mass-meeting and a representative congress, probably sometimes one, sometimes the other. It might be compared to a 'constituent assembly.'

"To treat a man as a heathen man and a publican or Roman tax-gatherer was simply to have no dealings with him. The heathen were not subjected to penalties of any sort in Judea; the Jews simply had no intercourse with them. The meaning, then, of Christ's ultimatum, as it would have been understood by his disciples, would be: If your fellow-member defies the public opinion of the Christian community to which you both belong, have nothing more to do with him.

"The great statesmen of the world, horrified by this terrible world war, are endeavouring to find some better method for the settlement of international difficulties than 'wager of battle,' and curiously, and as it seems to me very significantly, have hit upon the method which Christ commended to his disciples nineteen centuries ago. If I interpret Christ's counsel correctly, these statesmen are following Christ, whether they know it or not. For, if we apply the spirit of his counsel to international action, it would mean, first, Diplomacy; second, Arbitration; third, Judicial Procedure; fourth, to enforce such procedure, Non-intercourse. To interpret and apply this counsel a little more fully:

"I. If in the community of nations a controversy arises between two or more of them, the first step toward a settlement is diplomacy—that is, personal negotiation between the two nations. The object of this negotiation should be to gain a brother. Its spirit and its purpose should be pacific; its aim, to find some common ground on which the two nations can agree. Austria had a complaint against Serbia. The Austrian crown prince had been assassinated, and the Austrian government believed that the Serbian government had been accessory to the assassination. If the charge was true, the trespass committed by the Serbian government was very great. But Austria showed no desire in her negotiations to gain a brother. She treated Serbia as a criminal. She went with a demand in one hand and a threat in the other. And the demand was one to which no nation could accede under threat, without, by that very act, surrendering her independence.

"Christ also advises that these negotiations between the complainant and the supposed transgressor be private. 'Go and tell him his fault between thee and him alone.' Recently there has been in certain quarters a great outcry against secret diplomacy. There has been in this country some demand, though not very widespread or influential, for the abolition of the secret sessions of the Senate. It is said that secret negotiations have led to wars, and that, if all negotiations were conducted in the open, war would be avoided. And it is probably true that some wars have been prepared for, and perhaps promoted, by secret negotiations.

"But it is certain that wars have often been prevented by secret negotiations. There are many international questions which cannot be discussed in the open forum without arousing popular prejudices and exciting popular passions. There is a strong popular feeling in this country against unlimited Japanese immigration. There is a strong popular feeling in Japan hostile to American discrimination against Japanese immigrants. Popular discussion in the press of America excites race prejudice against the Japanese. Popular discussion in the press of Japan excites race prejudice against the Americans. There would be little danger of war between the two countries if we could only unite our forces in a successful war against the yellow press of both countries. If the Japanese question could be taken out of the public forum, there is little doubt that, by friendly negotiations between the Japanese mission now in this country and our President representing the Democratic party and Elihu Root representing the Republican party, an agreement could be reached which would calm the excessive self-esteem of the one people and the excessive fears of the other.

"II. If diplomacy quietly conducted between the two par-

ties in a spirit of mutual brotherhood fails, arbitration is the next step in Christ's league to enforce peace. It is evident that the two or three witnesses are to hear both sides of the incipient quarrel. Their opinion is to be listened to by both parties to the quarrel. There is, indeed, no suggestion that they possess *authority* to decide. Authoritative decision is reserved for the third stage in this proceeding toward peace. But they are not partisans of the complainant taken by him to overbear the accused. They are witnesses, taken to hear the story, to reach their conclusion upon it, and if no agreement can be reached by their aid, to report to the constituent assembly their judgment upon the undetermined issue. My readers will remember how urgent were the entreaties of England, France, Italy, and Russia to Germany and Austria to submit the issue between Austria and Serbia either to the Hague Tribunal for decision or to a conference of the Powers for amicable settlement, and how emphatic and almost contemptuous was the refusal.

"III. This was as far as Christian civilisation had gone in 1914 in its preparations to avoid war. Reformers had urged the constitution of a supreme court of nations to which any nation might be summoned to give account of its claims. But no such court had been constituted. The imperfectly organized Hague Tribunal could pass only on such questions as were submitted to it by the consent of both the parties to the controversy. Christ recommended to his disciples a further step—the creation of some sort of body—Parliament, Congress, Supreme Court, Constituent Assembly, Ecclesia—to which either party could report its complaint, a body which would have power to declare an authoritative judgment.

"And if the other party would not accept the judgment, what then?—war to enforce the decision? No! Non-intercourse.

"IV. If he will not hear the assembly, let him be unto thee as an heathen man and a publican.

"Let us imagine that in 1914 the eighteen nations now in alliance against the Central Powers had constituted a community of nations; that they had an international tribunal or assembly with power to hear and decide international questions; and that when Germany and Austria refused to submit the issue between Austria and Serbia to decision by that tribunal, the Powers had instantly and automatically pronounced a decree of non-intercourse. What would have happened? Every foreign ambassador in Germany and Austria would have been called home. Every German and Austrian ambassador would have been sent home. The mails between other countries and Germany and Austria would have been suspended. Telegrams of every description would have ceased. The world's ports would have been hermetically sealed against the offender. No exports could have passed from the Central Powers to other countries, no imports could have passed from other countries into their territories. Germany and Austria would have been as effectually isolated as if they had been transported bodily to Mars. The present blockade, which is threatening to bring Germany to her knees, would be insignificant by the side of such a world blockade. What nation would venture to defy it? What nation defying it once would ever venture to defy it a second time?

"It is true that such a league as is here foreshadowed would not absolutely prevent war. Germany might have invaded Holland, Belgium, France in the west, and Russia, Serbia, Bulgaria, Rumania in the east, to get by her arms the supplies which commerce refused to her. It might have been necessary to unite the armies of the world in defence of the right to decree and enforce non-intercourse against a defiant nation. But if such a league had existed in 1914, it would not have required three years of robbery on the land and piracy on the sea to call it into existence.

"If any ecclesiastical reader is inclined to think that the counsels embodied in the passage here interpreted and applied to international affairs were intended by Christ simply as a direction for Church discipline, I must refer him to my Commentary on Matthew for a statement of the reasons why I cannot agree with him; if any reader thinks they were intended only for the settlement of private disputes, I reply that the same principles apply to the settlement of disputes between organisations as between individuals. If any one thinks it extraordinary that the world should not have long since discovered and adopted Christ's league to enforce peace, if it is really suggested by his teaching, I reply that he who believes, as I do, that Jesus Christ is the divine leader of mankind will not think it extraordinary that he should still be in advance of the age and waiting patiently for his disciples to overtake him."

Chapter XIV—A Court House for the World

IN every country in the world, if it is so much as half civilized, there is some form of court. And yet the world itself is without one. There is, to be sure, the Permanent Court of Arbitration, agreed to at the Hague Conference of 1899, but that is a piece of judicial machinery, in form, without any force to give it effectiveness. And the utter futility of this Court to either stop or delay war was demonstrated so completely in 1914 that it doesn't seem possible that the world will care to have another demonstration. It is inconceivable that a league of nations should establish a court and permit it to be a mere shadow without any power to give it substance. Too much blood has been shed and debts too stupendous piled up for future generations to pay, to allow a peace conference to decide on a court that would be but a hollow mockery. As a distinguished jurist of the Netherlands, M. Asser, said in the Hague Conference of 1907, in speaking of the Permanent Court of Arbitration, "Instead of a Permanent *Court* the Convention of 1899 gave only the phantom of a court, an impalpable spectre, or, to speak more precisely, it gave a secretarial and a list. And when two powers having a difference to settle demand that the doors at The Hague be opened to them, the secretary-general, thanks to the munificence of Mr. Carnegie, can show them a splendid hall, but instead of a court he can only present to them a list on which they may find a large number of persons of a recognised competence, etc."

The Supreme Court of Arbitral Justice, which engaged so much of the attention of the Second Hague Conference in 1907, was not agreed upon, but if it had been, there is small ground to believe that it would have been more than a "phantom of a court," for no provision was made that hearings before it should be enforced. And the World Court, proposed and supported by a considerable group in this country, had the same inherent weakness, which undoubtedly explained its failure to obtain any broad popular endorsement either in the United States or in Europe.

Fully realizing the fatal weakness in these plans for international courts, the League to Enforce Peace made economic and military force the sanction that should compel signatory nations to present their differences for hearing. And from the moment the League was organized in Independence Hall, Philadelphia, on June 17th, 1915, it has steadily gained support for its program. The reason is manifest. In a world at war the doctrine was proclaimed that peace when it came could only be maintained if it rested on ultimate force. Instead of beating swords into ploughshares it was proposed, in effect, that they be kept in their scabbards ready to be drawn in defence of law.

This seemed strangely like a paraphrase from the Bible in grounding belief in the bringing of peace *with* the sword. It was seen at once that this was not militarism, against which democratic nations have fought, but simply placing effective power behind courts so that they would be respected and used.

Such a sane and practical plan won support from the responsible statesmen of the world—from men charged with the leadership of their nations in the great war. Above the battle smoke they saw arise, courts, envisaging the reign of law, supported and enforced by economic and military power. "The best security for peace," said Mr. Lloyd George in January, 1917, "will be that nations band themselves together to punish the peace-breaker. In the armories of Europe every weapon will be a sword of justice. In the government of men every army will be the constabulary of peace." And M. Ribot in June, 1917, while the premier of France, said in an address before the Chamber of Deputies, "We echo the noble desire of the President of the United States. Henceforth justice must have as a guarantee the League of Nations which is organizing before our eyes, and which tomorrow will be mistress of the world." Mr. Asquith in an authorized statement in November, 1917, said, "We must aim at something more than the negative functions of policing the world and preventing breaches of the peace; at nothing less than a partnership of the nations in the joint pursuit of a freer and fuller life for the countless millions who, by their efforts and their sacrifices, generation after generation, maintain the progress and enrich the inheritance of humanity. Nor must our reconstruction concern Europe alone. We must aim at setting up a world-wide peace partnership, of which all the civilized communities will be members on a level footing, with equal rights and reciprocal duties."

In the United States ex-President Taft and hundreds of the leading public men of the country and thousands of important journals have supported the League of Nations programme. The repeated endorsements from President Wilson have been read in all parts of the world. And it can be safely stated that the President has expressed the sentiment of his countrymen in all of these endorsements, of which the following is typical of many others: "So sincerely do we believe in these things, that I am sure I speak the mind and wish of the people of America, when I say that the United States is willing to become a partner in any feasible association formed in order to realize these objects, and to make them secure against violation. . . . I am sure the United States would wish their Government to move along the line of . . . a universal association of nations to maintain inviolate the security of the highway of the seas for the common, unhindered use of all the nations of the world, and to prevent any war begun, either contrary to treaty covenants or without warning and full submission of the cause to the opinion of the world—a virtual guarantee of territorial integrity and political independence. . . . I feel confident that the world is even now upon the eve of a great consummation, when some common force will be brought into existence which shall safeguard right as the first and most fundamental interest of all peoples and all governments, when coercion shall be summoned not to the service of political ambition or selfish hostility, but to the service of common order, common justice, and common peace."

The court house for the world, in view of the innumerable expressions of strong support from statesmen of all the belligerent countries, including those of Germany and Austria-Hungary, seems to have been long in coming to nations in sore need of it. For war, that has been given up as a means in settling differences within nations, has continued as a final arbiter between nations. The world has groped blindly toward a sane internationalism that would gather up and use the tested experience from nations, without seeking to destroy them. It has depended too much on other international forces, failing to perceive the essential place and power of justice. Among the fighting nations are seen the church, the temple or the mosque, but religion has not ended war. In the libraries of all the warring nations are the works of Goethe and Schiller, of Hugo and Balzac, of Shakespeare and Milton, of Tolstoi and Turgenieff—all imperishable contributions to the world's intellectual life, but still they have not ended war. The orchestras of Paris, Berlin, London and New York play the music of Beethoven, Tschaikowsky, Berlioz and Haydn, and music is one of the most spiritual of the arts, but it has not ended war. Painting and sculpture are part of the common heritage of mankind but they have not ended war. The world has had churches and schools and libraries and galleries—but the world like every other city and country needs a Court House. That Court is within our grasp. What is needed is to give it force through economic pressure and military power that will compel its use and it will become a bulwark of civilization, protecting the world from the waste and futility and the utter tragedy of war.

(To be continued.)

It's Pretty Soft for You!

You are working in the office, the shop or the factory, some because your country requires it, some because age or condition demands it. You are doing hard work, good work, patriotic work, but, after all, beside the lot of your soldier in France, it's pretty soft for you, isn't it?

You have a soldier in France who is facing death for you. What can you do for him? There is very little that you can do for him in comparison to what he is doing for you. But——

You can give him yourself—your loyalty in thought, word and deed.

You can give him your money—to the last dollar if he needs it to carry on your fight. But——

Your country does not ask you to give, but to invest your savings in the best and safest bond on earth—the Liberty Loan.

It's pretty soft for you, isn't it?

Buy your bonds today, that your soldier in France may know that the man for whom he's going through hell has fighting stuff in him, even if he has to stay at home.

GEORGE H. LORIMER,
Editor, *The Saturday Evening Post.*

Public Utility Commission News

Reports Concerning the Activities of State Rogulating Bodies in the Telephone Field

Alabama

THE Public Service Commission of Alabama has refused to issue an order granting telephone companies the right to tax new subscribers to telephones $2, $5 and $10, according to the amount paid for a telephone, in order to get instruments put in by those needing them.

Quoting Order No. 1931 of A. S. Burleson, postmaster general, relative to certain charges that are to be made for installing new telephones and for changing the location of telephones, the commission says:

"These charges, if established, result in an additional charge to the subscriber, which to all intents and purposes, is an advance in rates. If the authority for making telephone rates within the state of Alabama is now lodged with Mr. Burleson, then an approval of any changes which you contemplate making is not at all necessary by this commission.

"Further, it has never been the policy of this commission to approve rates and charges until after a thorough investigation, and I am frank to say to you, without an investigation, the charges herein proposed appear to this commission, prima facie, unjust and unreasonable; therefore, this commission declines to approve them."

A final decision in the Birmingham telephone rate case was proposed by the Alabama Public Service Commission until the October session at the regular September meeting of the commission. At the request of Fred Moore, city attorney of Birmingham, he was granted twenty days in which to file an additional brief answering the brief of Hunt Chipley, general counsel of the Southern Bell Telephone Company.

This case has been hanging fire for more than a year and is a proceeding brought by the city of Birmingham in an effort to reduce telephone rates in that city.

California

The railroad commission has issued an order to prevent inductive interference on telephone lines. This order lays down certain provisions for the location and construction of power lines to guard against cross currents. The rules are the result of five years' investigation in California by a committee appointed by the railroad commission.

Florida

The Florida commission is trying to save the users of telephones what the commission thinks unreasonable charges. On August 28 the postmaster general issued Order No. 1931, effective on and after September 1, 1918, providing an installation charge on all new stations, and also a charge for all changes in the location of telephones.

The installation charges to be made are as follows: Where the rate is $2 a month or less, $5.00. Where the rate is more than $2 but not exceeding $4 per month, $10. Where the rate is more than $4 a month, $15. The subscriber is also charged $3 for changing his telephone from one location to another.

The telephone companies of the state are filing this new schedule with the Florida Railroad Commission, asking approval of same. The commissioners have declined to approve these charges authorized by the postmaster general's order, regarding these charges unreasonable and wrong in principle. The rental rates allowed and adopted by the commissioners for the use of telephone companies are based upon all elements of cost, including installation.

The commissioners have heretofore allowed telephone companies to make a reasonable charge for moving a telephone from one room to another or from one building to another, and in order to protect companies from losing on installations, have heretofore approved the collection of three months' rental in advance on new installations to provide against the contingency of subscribers releasing their telephones in a month or two after installation.

The filing by the Southern Bell Telephone and Telegraph Company of a petition for authority to inaugurate substantial and general increases in long distance tolls and for a number of local rate increases, drew from C. Murphey Candler, chairman of the state railroad commission, an inquiry as to whether the petition was filed under the instructions or with the approval of the postmaster general and as to whether, in case the railroad commission should prescribe rates, the telephone company intended to observe them.

Mr. Candler's inquiry, addressed to J. Epps Brown, vice-president of the company, was made, as he stated in his letter, "in view of the fact that the Southern Bell Telephone and Telegraph Company recently made effective in Georgia scales of installation charges, notwithstanding the disinclination of this commmission to approve or consent to the same."

The attitude of the commission was one of a desire to know just how that body stands under federal ownership; whether its decisions will be respected and whether there is really any use taking up the matter. No date for a hearingg on the petition is to be set, it was said, until the commission hears from Mr. Brown.

Chairman Candler inquired of Mr. Brown:

"1. Whether the petition is filed under specific instructions of, or whether it has been submitted to and approved by the postmaster general.

"2. Whether or not, as to local exchange and toll rates on traffic wholly between points in Georgia it is the purpose of the operating officials of the Southern Bell Telephone and Telegraph Company, under the federal administration, to observe as maxima such schedules of rates and charges as the commission may prescribe, after consideration of your petition."

Recently the telephone company applied to the railroad commission for approval of increased installation charges. This application was declined, but the charges were, nevertheless, put into effect. This provoked Chairman Candler's inquiry as to whether the company purposed to follow the same course in connection with the petition filed on Wednesday.

PETITION WAS EXPECTED.

It is said that the telephone company has for several months been contemplating filing a petition for a general revision of tariffs. The petition calls attention to the order of Postmaster General Burleson, now in charge of telephones and telegraphs, to the effect that changes in schedules should be submitted through the regular channels and should also be submitted to him. In view of the fact that the decision of the railroad commission as to installation charges had no effect, however, Chairman Candler took the position that the inquiry should be addressed to Mr. Brown. Through this it is expected that the position of the railroad board will be refinitely established.

In reference to the installation charges the company asserted that the postmaster general had ordered them put into effect and that the company had no alternative but to obey the order.

Georgia

An interesting situation has arisen in public service charges in Georgia which may have an important future bearing, in which the Federal Government has issued a mandatory order one way, and the State Railroad Commission, taking a different position, declines to give its approval.

The Gainesboro Telephone Company has made application for permission to apply the series of service charges in the transaction of its business which the government has ordered be charged by the companies it has taken under control. That is, where the service is less than $2 per month per station, an "installation" charge of $5 shall be made by the company before the telephone is installed; where it is between $2 and $4 the company shall charge $10, and where more than $4 per month, a charge of $15 shall be made.

This order was issued by the postmaster general, who has charge of the telegraph and telephone lines, and is mandatory upon the Federal managers. It is in effect by the Southern Bell Company, and that company, through its Federal manager, made application to the Georgia Railroad Commission for its approval of the order, which the commission declined. Similar action was taken in the matter of the initial movement charge of $15 on freight cars, which the State Commission declined to approve, but that has been put into effect by the Federal-controlled roads.

Interstate

Changes in telephone or telegraph rates to promote standardization should be made only after submission for public hearing and consideration of the Interstate Commerce Commission and state utility commissions, it was suggested to Postmaster General Burleson by the war committee of the National Association of Railway and Utilities Commissioners.

Referring to the creation of rate standardization committees by the postmaster general, the committee of state commissioners wrote to Mr. Burleson:

"Our suggestion is that before taking final action the committee issue tentative reports and send them to every state commission having jurisdiction over rates, for comment and criticism; that a conference be thereupon called between representatives of the commissions and your department, at which this subject may be discussed; and that any new schedules which you may eventually determine upon be filed with the federal and state commissions in the usual manner, with a statement of the reasons for the change."

Illinois

Proposed rates of the Central Union Telephone Company at Rockford and Decatur were suspended until January 28 next.

Indiana

An increase in rates was granted to the Eel River Telephone Company after an investigation of the operating expenses of the two plants.

The report says that the value represented by the books of the companies as investigated show the value of the property to be slightly in excess of $70,000 and that the returns from the property for the year ending June 30, 1917, was $18,206.94, and that the company, with its investment, is entitled to earn about $1,300 more than this amount. The commission also orders that all charges shall be uniform and that there shall be no discrimination, and no free service.

In the petition the company had only asked for an increase in rural rate of from $1 to $1.40, with a 15-cent allowance if paid before the 10th of the month. This would have meant a net increase of 25 cents a month on a rural telephone, but the commission ordered instead that there should be a uniform advance of 10 cents on all residence telephones.

Business telephones were raised from $2 to $2.10 per month. Business party lines from $1 to $1.60. Residence from $1 to $1.20. Rural from $1 to $1.20 a month. A 10-cent reduction for payment before the 10th of the month will be made. All those who had been getting telephones at reduced rates will be required to pay the usual fee.

In Sidney all the rates had been $1 a month. Now business telephones will be charged $1.35 and residence and rural telephones $1.20. From this price a deduction of 10 cents will be made if payment is made before the 10th of the month.

Minnesota

Declaring that installation charges proposed by telephone companies are excessive and unjustifiable, the State Railroad and Warehouse Commission refused to approve the schedules and protested to Postmaster General Burleson against effecting them in Minnesota by Federal order.

A "readiness to serve," or installation charge of $5 to $15, depended on the monthly rental of the service required by the subscriber, is made effective by Federal order No. 1931.

The commission objects to the amounts charged on these grounds:

That the sums are excessive and cannot be justified by the telephone companies.

That the expense of an installation has no connection with the monthly rental charged for telephone service, and that a graduated charge based on monthly rental has no foundation.

That the installation fee as ordered will actually reduce the number of telephone subscribers and impair the value of the service, will reduce the operating revenues of the companies, and will cause facilities of the companies to remain idle that could be used at a very slight expenditure of labor and material.

It appears, Commissioner Putnam states, that a $5 charge would reimburse the company for any loss it might have from the installations.

A disparity has appeared between the rates charged by the Northwestern Telephone Exchange Company for the installation of telephone instruments in Minneapolis and those collected by the Tri-State Telephone Company in St. Paul for similar services, under the government's new ruling, effective September 12.

It results because the Northwestern company bases its installation charge on the net rental. The difference between installation charges in the two cities is $5 for practically all kinds of service and is favorable to Minneapolis.

Installation charges were fixed in the general order of the government on the basis of the monthly rental. Instruments renting for $2 a month or less are installed for $5; those renting for from $2 to $4 or less, for $10, and telephones renting for $4 a month or more are installed for $15.

The Northwestern Company has elected to charge installation rates based on its net rentals. For example, the gross rental of a two-party telephone is $2.50 a month, but 50 cents is refunded if the rent is paid on or before the 15th of the month, making the net rental $2, and the installation charge, consequently, $5. On the other hand, the Tri-State Company bases its installation charge on the gross rental of $2.50, making it $10.

Due to these interpretations of the government order, the installation of a business telephone in Minneapolis costs $10, while in St. Paul it costs $15. St. Paulites also have to pay for the resumption of service after their telephones have been disconnected temporarily, while Minneapolis residents do not.

Attention has been called to these facts in reports to J. W. Howatt, telephone supervisor of telephones for the state railroad and warehouse commission. "This difference in the inter-

pretation of the order indicates that something is radically wrong," said Mr. Howatt, declaring that an investigation will be made.

It is the opinion of telephone officials that the matter eventually will go to Postmaster General Burleson, or a representative, for adjustment.

In the matter of the petition of A. L. Buchanan, H. Wyant, J. H. Lightly, M. Buchanan, and F. A. Lieniger, for a physical connection between the toll lines of the Northwestern Telephone Exchange Company with the local exchange system and lines of the Four Corners Telephone Company and the Interstate Telegraph and Telephone Company, in the village of Oakland, Minn., hearing was held at Austin, November 13, 1917. It developed that the exchange of the Four Corners Telephone Company was connected to the toll lines of the Tri-State Telephone & Telegraph Company through the lines of the Interstate Telegraph & Telephone Company, and with such connections was able to communicate with all points connected with the Tri-State system.

Since the hearing in the above matter, all the toll lines of the Northwestern Telephone Exchange Company in and around Oakland, Minn., have been purchased by and are now the property of the Tri-State Telephone & Telegraph Company, and through the connections with the Interstate Telegraph & Telephone Company the subscribers of the Four Corners Telephone Company are able to communicate with all points reached by either the Tri-State Telephone & Telegraph Company or the Northwestern Telephone Exchange Company.

This case therefore becomes mute, and is ordered dismissed.

In the matter of the application of the Northwestern Telephone Exchange Company, the Tri-State Telephone & Telegraph Company and the Zenith Telephone Company to place in effect certain charges for service connections, moves from one location to another, suspension of service, changes in location on same premises of wiring or instruments and charges for changes of equipment, the applicants having filed requests to withdraw their petition because the United States Government, through the postmaster general, has acted upon the same subject matter, the petition is ordered dismissed.

The Arco Telephone Company, operating a local telephone exchange at Arco, Minn., and rural lines in the vicinity, serving a total of 157 stations, asked authority to increase its rates for business telephones from $1.25 to $1.50 per month, and its rate for residence and rural telephone service from $1.00 to $1.25 per month.

A statement of expenditures made by the company for the past year was presented, but it was impossible to determine from the statement what moneys were used toward the operation of the plant and that chargeable to the capital account.

Witnesses were unable to verify figures shown in the annual reports of the company, nor were they able to make an allocation of the amounts covered by the exhibits. Witnesses were also unable to give any satisfactory evidence relative to the value of the telephone plant in service.

The evidence clearly indicated that the accounting methods are very lax and that records are not kept in accordance with the uniform system of accounts prescribed by the commission. The commission therefore has no facts upon which to base an order other than dismissal. It is therefore ordered that the application be denied, and the same is hereby dismissed. It is further ordered that the Arco Telephone Company install a system of records as provided for in the uniform system of accounts prescribed by the commission.

In the matter of the application of the Eden Valley Telephone Exchange Company for authority to increase its local and rural rates at Eden Valley, Minnesota, the petitioner asked authority to place in effect the following schedule:

Individual Line, Business	$2.25 per month gross
Individual Line, Residence	1.50 per month gross
Two-party Line, Residence	1.25 per month gross
Rural Multi-party	1.50 per month gross

A discount of 15 cents per month to be allowed if payment is made on or before the 10th day of the month.

No evidence as to valuation was submitted, and the testimony indicates that the officers have little if any knowledge as to the value of the physical properties of the company. The records and accounts are poorly kept and are not in accordance with methods prescribed by the commission. No evidence was offered as to the revenues and operating expenses of the company, and witnesses admitted that the annual reports of the company to the commission were not correct.

There being no evidence introduced to show that the company is entitled to the rates petitioned for, the application is denied without prejudice and the case therefore ordered dismissed. It is further ordered that the Eden Valley Telephone Exchange Company forthwith install a system of records and accounts in accordance with the uniform system of accounting prescribed by the commission.

In the matter of the application of the Maple Lake Telephone Company for authority to increase its local and rural rates for telephone service at Maple Lake, Minnesota, the petitioner asks authority to place in effect the following schedule:

Individual Line, Business	$2.00 per month
Two-party Line, Business	1.50 per month
Individual Line, Residence	1.50 per month
Four-party Line, Residence	1.25 per month
Rural Multi-party	1.50 per month

No evidence was offered bearing upon the operating revenues and expenses of the company, and witnesses were unable to verify figures contained in the annual reports of the company to the commission. No appraisal of the property has been made, the company basing its values upon the purchase price of a majority of the stock acquired several years ago, adding thereto expenditures for construction and maintenance since that time. The testimony indicates that the records and accounts of the telephone company are in very poor condition and not in accordance with the uniform system of accounts prescribed by the commission.

There being no evidence whatever to show that the company is entitled to the rates petitioned for, the application is denied without prejudice, and the case therefore ordered dismissed. It is further ordered that the Maple Lake Telephone Company forthwith install a system of records and accounts in accordance with the uniform system of accounts prescribed by the commission.

The application of the Mount Vernon Farmers' Telephone Company, Lewiston and Altura, Minnesota, requested authority to place in effect a rate of $14.00 per year for each class of service. In order to correct the discriminatory features of this rate because of the company's furnishing individual and party line service, the application was amended as follows:

Individual Line, Business	$1.25 per month
Two-party Line, Business	1.00 per month
Individual Line, Residence	1.16⅔ per month
Rural Multi-party	1.16⅔ per month

Witnesses were unable to give any information as to the number of subscribers receiving service under the different classifications. No evidence was submitted showing the revenues of the company under the present rates, nor what they would be under the proposed rates. Neither was there any evidence submitted or statements presented to show the present operating expenses of the company or what the operating expenses might be in the future. The officers of the company have little, if any, knowledge as to the value of the property in service, the exhibits presented covering only an inventory of the central office equipment and certain supplies.

The commission finds the evidence wholly insufficient to show that the company is entitled to an increase in its rates and denies the application without prejudice.

The application is therefore dismissed.

The commission finds the Redwood Falls Electric Telephone Company has failed to furnish residents of the city of Redwood Falls individual party residence telephones according to its rate schedule; that those conditions have existed for several years and with full knowledge of the officers of the telephone company. The commission deems it to be its duty to correct all discriminatory features whenever called to its attention, and insists that the Redwood Falls Electric Telephone Company furnish individual line residence service to all parties demanding said service. Therefore it is ordered that there shall be put in effect as rates by the Redwood Falls Electric Telephone Company, in the City of Redwood Falls, Minnesota, the following schedule:

Individual Line, Business	$2.00 per month, net
Individual Line, Residence	1.00 per month, net

Two-party Line, Residence	.75 per month, net
Four-party Line, Residence	.50 per month, net
Rural Switching	.25 per month, net

To be put into effect on and after October 1, 1918.

It is further ordered that the Redwood Falls Electric Telephone Company construct such additional facilities as shall be required to furnish to its subscribers demanding the same, individual line residence service, and that ninety days is granted to make such additions to its lines as is necessary for furnishing such service; that upon the completion by the telephone company of the additional facilities required, the company may make an application before the commission for the adjustment of its residence rates as the conditions then may require.

It is ordered that the Greenfield Farmers' Telephone Company be permitted to place in effect, as of October 1, 1918, the following schedule of rates for telephone service at its Wabasha and Kellogg, Minnesota, exchanges:

Individual Line, Business	$2.25 per month, gross
Two-party Line, Business	1.75 per month, gross
Individual Line, Residence	1.75 per month, gross
Two-party Line, Residence	1.50 per month, gross
Four-party Line, Residence	1.25 per month, gross
Extension Telephones	.50 per month, net
Rural Multi-party	1.50 per month, gross

All rates to be billed gross except where quoted net. All rates payable in advance, with a discount of 25 cents per month from the gross rate if paid on or before the 15th of the month in which the service is rendered, except that rural rates are payable quarterly in advance, with a discount of 75 cents if paid on or before the 15th of the first month of the quarter; a discount of 50 cents if paid on or before the 15th of the second month of the quarter, and a discount of 25 cents if paid on or before the 15th of the third month of the quarter.

It is ordered that the Watertown Telephone Company be authorized to place in effect at its Delano, Minnesota, exchange the following schedule of rates for local and rural telephone service:

Individual Line, Business	$2.50 per month,	gross
Two-party Line, Business	2.00 per month,	gross
Individual Line, Residence	1.50 per month,	gross
Two-party Line, Residence	1.25 per month,	gross
Extension Telephones	.25 per month,	net
Rural Multi-party (Wall)	3.00 per quarter,	net
Rural Multi-party (Desk)	3.25 per quarter,	net
Rural Switching	3.00 per year,	net

(With a minimum of $15 per circuit per annum.)

All above rates to be quoted gross except where quoted net. All gross rates payable monthly in advance, with a discount of 25 cents per month if the bill is paid on or before the 20th of the month in which the service is rendered.

The Northwestern and Tri-State Telephone Companies urge the State Railroad and Warehouse Commission to abandon its accounting of the books of those companies.

The conference at the capitol also was attended by representatives of the federal telephone administration.

The company officials contended that the examination of the books was not authorized by the federal administration and would be of no value after the properties are returned to the private owners after the war.

No objection was made to the physical valuation of toll companies which has been in process the past year in Minnesota and which will shortly be completed. Northwestern telephone officials said the company spends $10,000 a month in following this valuation work and that it costs the Tri-State Company $4,000 a month.

Postmaster General A. S. Burleson has ruled that if a subscriber notifies the telephone company that he is to move into a residence where a telephone is already installed before the instrument is disconnected, the charge will be only $3.

If he fails to so notify the company the charge will be $5.

Missouri

The Public Service Commission has fixed a uniform price of $1.25 per month as rental for all telephones in Excelsior Springs. The new orders became effective September 1.

The commission has granted the Southwestern Bell Telephone Company a 9 per cent increase in rates on long distance service.

Nebraska

In Iowa, the speaking of German over the telephone has been officially forbidden by proclamation of Governor Harding. In Nebraska, the state and county councils of defense have recommended the same thing, but some trouble has been encountered from obstinate Germans in certain localities. The result was that a number of inquiries from telephone managers as to their authority to remove the telephones of those who persist in German talk came in to the railway commission.

In answer to one of these queries the commission rules as follows:

"The commission desires to call your attention to the common law obligation of telephone companies as common carriers to furnish service to the public. This obligation cannot lightly be set aside. A telephone company could not be asked, of course, to aid in the commission of crime, nor to knowingly permit the use of its facilities for the commission of crime. For instance a telephone company would be well within its rights to disconnect the telephone of a subscriber who used profane or indecent language, because such subscriber would be violating the criminal law. In the same way the telephone company could take some action where a subscriber was guilty of sedition, as defined by the Nebraska law, where the seditious utterances were made over the telephone.

"The commission has always recognized that the rights of the public to the public service performed by telephone companies are greater than those of any individual, and where an individual wantonly and maliciously interferes with service, it is a sufficient reason to eliminate such a subscriber from the lines.

"The commission knows of no law which refuses to an individual the right to use some other language than the American language, either in conversation or over the telephone, and it knows of no way in which telephone companies of Nebraska can fulfill their obligations as common carriers of messages, nor protect themselves against actions for damages, if the use or non-use of the American language is the basis on which service is rendered or discontinued.

"If any telephone subscriber in Nebraska is known to be disloyal and to be using his telephone for seditious purposes, his telephone should be disconnected immediately. If there is merely suspicion on the part of neighbors that a subscriber is using a foreign language over the telephone for disloyal purposes, the telephone company should certainly inform the county attorney or the federal district attorney for Nebraska, or both, and ask for an investigation, and should proffer to legal investigators access to its facilities. If the secret service agent finds case enough against the suspected subscriber to cause his arrest, the telephone of such subscriber should be eliminated.

Pressure of Nebraska telephone managers for a ruling by the railway commission as to whether the new government rate for installation of telephones will be sanctioned by the state body will shortly bring out a statement, it was indicated by the commission. Appeal from Alfred Bratt, president of the Monroe Independent Telephone Company of Genoa, Neb., asked permission to collect the new rate ordered by Postmaster General Burleson, keeping it in a returnable fund subject to later action by the state railway commission. The Nebraska Telephone Company of Omaha and the Lincoln Telephone and Telegraph Company of Lincoln have filed application with the commission for official sanction to charge government rates, but the commission has heretofore indicated that such permission will be withheld pending a proper hearing on the matter.

The state railway commission, in an order prepared by Commissioner Victor E. Wilson, has established the following increased rates for the exchange of the Lincoln Telephone Company at Hebron: Individual business, $30 a year; individual residence, $18; two-party residence, $15; farm, $15. Rates are also established for parties outside the city limits and for joint service and extension telephones. Not less than $4,025 for maintenance and depreciation is to be set aside annually. The order goes into effect October 1. The return to company for interest and dividends is limited to 6 per cent per annum of the present value of the property, plus the cost of subsequent additions and betterments made from the company's capital funds. The commission finds that the reproduction value of the exchange property is $44,706, and the present value 20 per cent less than reproduction value new, or $35,765. The commission allows 3 per cent or $1,335 for working capital, making the present value of the property, plus working capital, $37,100.

The Nebraska railway commission, without a hearing, increased the flat rate of $1 a month on telephone service of the Steel City Telephone Company by 50 cents for business and 25 cents a month for residence telephones. At the same time the commission reduced the annual dividend on company stock from 8 per cent to 7 per cent, with the provision that the surplus should go into the depreciation fund of the company.

A raise in rates from $1 to $1.25 per month on all classes of subscribers—business, resident and farm lines—has been allowed by the state railway commission to the Union Mutual Telephone Company of Union.

New Hampshire

The decision of the Public Service Commission in the matter of a reduction of rates between Hollis and Nashua and of an extension of the Hollis line to Hollis station, the request for reduced rates is denied on the two grounds that while the situation in Hollis is aggravated by a number of circumstances, the situation is not sufficiently bad to permit a violation of the uniform and standard rates as a special favor, and secondly, that the telephone companies as a rule are not receiving sufficient revenue now to offset the increased cost of operating and maintaining their lines. The commission postpones definite action in regard to the Hollis Station extension in the following language:

"Extension of service by all utilities has, at the request of the federal government, been curtailed as much as possible while the war lasts. This is in keeping with the necessity of conserving labor and materials for war purposes. It would not be proper at this time to order the Hollis Telephone Company to expend the money, labor and materials necessary to construct this mile of telephone line when the same could be used to so much better advantage in other ways towards helping win the war.

"When conditions again become normal the petitioners may renew their request for extension to the railroad station, and unless the proprietor of the Hollis Telephone Company will make some satisfactory arrangement to furnish this service a further hearing will be held and the matter considered in the light of normal conditions."

Ohio

Telephone installation charges ordered by Postmaster General Burleson are condemned as outrageous, outlandish and positively wrong and inexcusable by the state public utilities commission, which refused to approve the Burleson schedule, when Ohio telephone companies attempted to file it. The commission has taken an attitude of open rebellion against the national telephone administration and litigation to test the federal government's authority in the matter is imminent.

Burleson ordered the telephone companies to charge fees for installation of all new telephones amounting to $5 for service costing $2 a month; $10 on $2 to $4 a month, and $15 on more than $4 a month. Ohio laws provide that telephone companies can collect charges only as set forth in schedules filed with and approved by the utilities commission.

The rates ordered by Burleson "may be all right in New York, for all I know, but Burleson can't shove them on us in Ohio without our protest," said Chairman C. C. Marshall, of the commission. "It may be that Burleson has the power to force it through, and that's what he'll have to do in this state. He can't collect it under Ohio laws. It may be he can under federal laws, but if so, he'll have to fight for it."

The form the litigation will take remains to be seen, but it is suggested that if the telephone companies refuse to install telephones without payment of the extra charges, somebody will probably file a suit for a mandatory injunction in the federal courts, ordering the installation of the telephone."

The state public utilities commission maintains that the charges are excessive and urges people not to pay them, seeking in the meantime a way of testing the Burleson order in the courts.

Report came to the commission of the experience of a dentist who wished to open an office on State street and establish a residence in Columbus. Both telephone companies refused to install the telephones he ordered for the office and residence, without payment of the charges. He refused to pay, as the charges, plus three months' advance rental, would make a total of approximately $80 in initial outlay for securing the use of both telephones.

The Warren & Niles Telephone Company hearing that was to have been held on September 3 before the state utilities commission has been postponed until October 8, and at that time there will be a representative committee from council there asking for an investigation of the service rendered by the company.

Oklahoma

Corporation Commissioner Campbell Russell announced that, regardless of the Washington order giving Postmaster General Burleson final jurisdiction in questions involving advances in rates for telephone service, the commission will continue to receive, hear and pass upon applications of wire companies for higher service charges.

It is assumed by members of the corporation commission that General Burleson, in the performance of his new duties, will pass upon the recommendation of the commission in all cases where a raise in rates is asked, rather than conduct an independent investigation of the merits of each case.

"We will proceed as usual to hear all cases that are filed with us, make orders according to our findings, and when officially notified we will forward our recommendations to General Burleson," said Commissioner Russell.

Study of the application filed by the Southwestern Bell Telephone Company and other companies for permission to make installation and removal charges shows the rates for this service, as allowed by the Washington order, are double what was asked by the companies.

The charges fixed by Washington range from $5 to $15, while the fees asked by the companies range from approximately $2.50 to $7.50.

General increases in rates for virtually every class of service, except long distance, were granted by the corporation commission to thirty-one telephone companies. The increases average about $1 a month over the flat rates now in effect for business, residence and rural telephones.

The increases granted by the commission are to offset the increased cost of labor, material and general operating expenses, and are to become effective September 1. Companies granted

the advances are prohibited from making a profit on the new rates, which, it is estimated, will barely overcome the increased cost of operation.

Yale Telephone Company of Yale—$36 for one-party business stations; $36 for business stations, mine type, one-party; business stations extension, $12; residence, one-party, $21; residence, two-party, $18; residence extension, $9; rural owned, multi-party, $15; switched multi-party, $6.

Bradley Telephone Company of Yale—One-party business stations, $30; one-party residence, $18; rural stations, multi-party, $18.

Covington Telephone Company of Covington—Business stations, $30; residence stations, $18; rural owned, multi-party, $15; rural switched, not multi-party, $6.

New State Telephone Company of Cooperton—Business stations, $24; residence stations, $15; rural owned, multi-party, $15.

Cyril Telephone Company of Cyril—One-party business stations, $30; one-party residence stations, $18; rural owned multi-party, $18; rural switched multi-party, $6.

Hanna Telephone Company of Hanna—One-party business stations, $30; one-party residence stations, $18; rural owned multi-party, $18; rural switched multi-party, $6.

Bessie Telephone Company of Bessie—One-party business stations, $30; business extensions, $6; one-party residence, $18; rural owned multi-party, $15; rural not owned multi-party, $—.

Mangum Telephone Company of Mangum—One-party business stations, $24; one-party residence, $15; rural owned multi-party, $15; rural owned switched multi-party, $6.

The Crescent Telephone Company of Crescent—One-party business stations, $30; business extensions, $12; one-party residence, $18; residence extensions, $6; rural owned multi-party, $15; rural owned switched multi-party, $15.

Foss Telephone Company of Foss—One-party business stations, $30; one-party residence, $18; rural owned multi-party, $15; rural switched, multi-party, $6.

Tecumseh Telephone Company of McComb—One-party business stations, $30; non-party residence stations, $18; rural owned multi-party, $18; rural switched multi-party, $6.

Okemah Telephone Company of Okemah—One-party business stations, $33; business extension, $12; one-party residences, $20; residence extension, $6; rural owned multi-party, $15; rural switched multi-party, $6.

New State Telephone Company of Roosevelt—Business stations, $24; residence stations, $15; rural stations owned multi-party, $15.

Hominy Telephone Company of Hominy—One-party business stations, $30; for stations on oil lease lines, multi-party, $36; business station extensions, $6; one-party residence, $18; residence extensions, $6; rural owned multi-party, $18.

Francis Telephone Company of Francis—Business stations, $30; residence stations, $18; rural switched multi-party, $6.

Billings Telephone Company of Billings—One-party business line, $30; business extensions, $9; one-party residence stations, $18; residence extensions, $9; rural stations, owned multi-party, $6.

Modern Telephone Company of Prentiss—For station facilities owned by the company, $15; for stations switched only, $6; minimum for any one line switched, $15; maximum for any one line switched, $120.

Oregon

The Lebanon Mutual Telephone Company was granted authority to increase its telephone rates by an order issued by the public service commission. The principal features are an increase of 25 cents per month for the desk type business telephones, an increase of 25 cents per month in the two-party business service rate, and an increase in the net rate for farmer line switching service of 7½ cents per month.

The public service commission, through Commissioner Buchtel, is making an effort to compel the Postal Telegraph-Cable Company to enter into an agreement under which the California-Oregon Power Company may make use of the telegraph poles to extend its power service to a certain district in the city of Medford. The telegraph company has refused, saying that it is now under government control and not under the jurisdiction of the commission. Commissioner Buchtel has taken the matter up with the postmaster general.

Pennsylvania

The public service commission has approved the sale of the Central District Telephone Company, operating in Western Pennsylvania, to the Bell Telephone Company of Pennsylvania. The price paid was approximately $16,000,000.

A new schedule of rates has been filed with the public service commission by the Pfoutz Valley Telephone Company, to take effect October 1. Subscribers' rates will be increased as follows:

Multi-party business rates will be increased from $15 to $18. Individual line business rates will be $30; two-party business rate, $24, and two-party residence rate, $24. The Pfoutz Valley Telephone Company operates in Inglenook, Dauphin County; Newport and New Bloomfield, Perry County, and Thompsontown, Juniata County.

The Perry County Telephone and Telegraph Company, operating in Thompsontown, Juniata County, and in Inglenook, Dauphin County, filed new rates with the public service commission. The following changes will become effective October 1:

Multi-party line residence rate, for exchange and non-exchange districts, will be increased from $12 to $15 per year.

A new tariff of rates has been filed with the public service commission by the Springfield Telephone Company, operating in Springfield borough, Erie County. The new rates to become effective on October 1st.

The increase for individual line telephones is from $12 to $18 per year, while party line rates are to be jumped from $12 to $15 per annum.

Rhode Island

The Providence Telephone Company and the New England Telephone and Telegraph Company were granted formal permission by the public utilities commission to put into effect, as of September 1, the new schedules of rates charged for the installation and transference of telephones, as authorized in a mandatory order recently issued by Postmaster General Burleson.

Where the monthly rate charged for a telephone is $2 or less, installation or change of a phone will hereafter cost $5; where the rate is more than $2, but not exceeding $4 a month, the charge will be $10, and where the monthly rate is more than $4 installation or change will cost $10.

Chicago Operators Raised

Changes in operators' schedule and pay, with a view to meeting the situation created by the fact that they are required to work evenings, were announced by the Chicago Telephone Company. The changes represent an estimated increase in the pay roll of $289,000.

Before September 1 of the present year the operators were excused from duty as the press of calls permitted, but were not paid for time off. The new system permits time off with pay when traffic is slow and pays time and one-half while working.

Operators working Sundays, prior to the new regime, were paid time and one-half. Now they are to be paid the same rate for the first Sunday, and double time for all other Sundays worked in same calendar month. For holidays the system was one and one-half time if worked and no pay for absence. Double time for all holidays worked is provided in the new order, with straight time for holidays off.

The company has for some time, according to officials, been suffering from a shortage of operators, due to more leaving the force than it is possible to train. Many have gone into governmental work, and many are now in France operating the stations back of the lines.

The reasons given by operators for leaving the service were mainly that they were required to do Saturday afternoon, Sunday and holiday work.

The new authorization of increase in pay and changes in time schedules is believd to have solved the problem of getting operators to cover the shortage and restore perfect service to the city.

Of Interest to the Trade

What the Telephone and Accessory Manufacturers are Doing to Advance the Art

Teaching the People How

A large proportion of telephone users do not use their instruments so as to get the best grade of transmission that their equipment is capable of producing. Some subscribers stand away from the telephone and

expect the party at the other end of the circuit to get the message clearly, while still others all but crawl into the mouthpiece.

The Stromberg-Carlson Telephone Manufacturing Company is co-operating with the telephone companies to help correct these operating conditions by offering for sale at actual cost the set of directory illustrations shown herewith. These cuts are made so as to be readily used within the type limits of the average size directory page and produced with a medium coarse half-tone screen to give proper results on uncoated paper stock.

Telephone companies interested in obtaining a set of these printing plates for their directory can obtain complete information by applying to the Advertising Department of the Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y.

Michigan Proposes Standard Rates

Telephone companies of the state of Michigan in reply to questionnaires recently sent them on which to figure a basis of compensation by the government for properties taken under government control, have replied, in effect, that at present rates these properties cannot be operated and provide fair compensation.

The companies were asked to give proposed rates for telephone exchanges according to varying regulations, Grand Rapids being included in the 25,000 to 50,000 class, and the tentative rates are as follows:

EXCHANGES UP TO 2,000 POPULATION.

Business—One-party, $24; extension, $9. Residence—One-party, $18; four-party, $15; extension, $6. Rural—Within 6 miles of central office, business, $24; residence, $18; over 6 miles, but within exchange area, add $3.

EXCHANGES, 1,000 TO 5,000 POPULATION.

Business—One-party, com. bat. $30, mag. $30; four-party, com. bat. $24, mag. $24; extension, $9. Residence—One-party, com. bat. $21, mag. $18; four-party, com. bat. $18, mag. $15; extension, $6. Rural—Within 6 miles of central office, business, $24; residence, $18; over 6 miles, but within exchange area, add $3.

EXCHANGES 5,000 TO 10,000 POPULATION.

Business—One-party, com. bat. $36, mag. $30; four-party, com. bat. $30, mag. $24; extension, $9. Residence—One-party, com. bat. $24; mag. $21; two-party, com. bat., $21; four-party, com. bat. $18; mag. $18; extension, $6. Rural—Within 6 miles of central office, business, $24; residence, $18; over 6 miles, but within exchange area, add $3.

EXCHANGES 10,000 TO 25,000 POPULATION.

Business—One-party, com. bat. $42, mag. $36; four-party, com. bat. $36, mag. $30; pay station extension, $9. Residence—One-party, com. bat. $27, mag. $24; two-party, com. bat. $24; mag. $21; four-party, com. bat. $21, mag. $18; extension, $6. Rural—Within 6 miles of central office, business, $24; residence, $18; over 6 miles, but within exchange area, add $3.

EXCHANGES 25,000 TO 50,000 POPULATION.

Business—One-party, com. bat. $48; two-party, $42; four-party, pay station, $36; extension, $9. Residence—One-party, com. bat. $30; two-party, $24; four-party, $21; extension, $8. Rural—Within 6 miles of central office, business, $24; residence, $18; over 6 miles, but within exchange area, add $3.

Directory Illustrations Showing Wrong and Right Way. Cuts Furnished by Stromberg-Carlson.

Iowa State College Courses

The Engineering Extension Department of Iowa State College, Ames, Iowa, is offering this year, besides the regular two-year courses, three special short courses and thirteen correspondence courses. Two of the short courses are for draftsmen. The course for radio and buzzer operators is similar to the course which was given last year and which has been given in both Cedar Rapids and Des Moines during the past summer. This course, as it has been given in the past, extended over a period of six weeks, but to meet a change in the navy requirements in which the standard has been raised from ten to fifteen words per minute, the course has been lengthened to eight weeks. This course should be taken by those who expect to enter the radio service in the navy or the signal corps in the army, as it has very little value as a preparatory course in commercial telegraphy. Since enlistment in these branches of military service ultimately depends upon passing the physical examination which is given at recruiting stations, it is advisable before registering in this course, to consult an examining officer, or a competent physician relative to one's physical condition.

The only requirements which those who register in any of these special short courses must meet is that they must have completed eighth-grade work or equivalent.

A Pay-Your-Bill-at-Office Advertisement for Operating Companies.

Kellogg Advertisement for Operating Companies Featuring Importance of Telephone Directory.

Electrotypes and Lantern Slides to Meet Demand

The Kellogg Switchboard & Supply Company, on the alert to assist operating companies in an advertising way and to meet individual needs, has prepared some new copy as shown in the accompanying illustrations. One of these advertisements or slides—for they can be furnished in either style and in any size desired—is designed to help the operating company economize by inducing subscribers to pay their bills at the office, rather than expect or wait for a collector.

Another drawing was made following the suggestion of several Kellogg exchange managers for a lantern slide or advertising plate to reduce the number of useless calls which immediately follow fires and other disturbances in the vicinity of the local exchange.

The third drawing which really is a part of a series already produced by the Kellogg company, plays up the vast importance of the telephone directory to the citizens of every community.

If there are any in a quandry over some point of advertising or publicity or influencing of subscribers to help in certain ways in improving service, the Kellogg company is ready and anxious to co-operate, with original ideas, whether in the form of letters, stuffers, separate plates or lantern slides, or a complete series of newspaper advertisements.

In common with its own advertising of telephones and switchboards, the Kellogg company has, in the production of telephone exchange publicity, kept originality in mind in all of its publicity work.

It is certain that a Kellogg advertisement copied after some other advertisement already appearing has never been observed. A great many of the Kellogg ideas, however, have been used by competitors and advertisers in other lines, but the Kellogg company believes that "imitation is the sincerest flattery."

Deferred Classification for Employes

The following suggestion, based on direct information from the various district boards of Chicago as to proper procedure in connection with deferment of employes on industrial grounds, are submitted for the information and guidance of Signal Corps contractors in claiming deferred classification for employes.

"It will greatly simplify matters if you will appoint some one man to handle these claims; then instruct every employe within the draft

age to bring his questionnaire and all communications from his Local Board to the man you have selected. If your employe brings his blank questionnaire, have him fill out Series XI entitled "Industrial Occupation," then have affidavit No. 1 made by the man's immediate superior (foreman or superintendent, etc.), and affidavit No. 2 by the executive head of your concern designated for this purpose. This latter affidavit is very important and will not be accepted unless it is made by the proper, designated person. Please advise your District Board the name of the executive head who is authorized by your concern to sign affidavit No. 2. If your employe has already filed his questionnaire at his Local Board, and the industrial claim has been omitted, then he must go to his Local Board to fill out his Industrial Occupation, providing he or his employer desires to request deferred classification upon industrial grounds. In this case you may furnish him with copies of Affidavits Nos. 1 and 2 properly made out and sworn to.

"In addition to this we suggest you file with the questionnaire of each registrant a brief statement on your own stationery of just what percentage of Government work you are doing, either direct or indirect; why you consider your industry a "necessary" one, and the numbers of any Government orders you may have. Also state what work the registrant is doing, why you consider him indispensable, and how long it would take to train a man to replace him.

"The first question we must ask is, 'Is this a necessary industry?' The second, 'Is this man necessary to this industry?'"

By authority of the Department Signal Officer: W. W. Truitt, First Lieutenant, Signal Corps.

Advertisement Designed by Kellogg to Reduce Curiosity Fire Calls.

North Electric Manufacturing Company to Make Automanual

The North Electric Company, one of the oldest manufacturers of telephone apparatus in the country, has been reorganized under the laws of Ohio as the North Electric Manufacturing Company. Its principal product will be machine switching telephone systems, of the semi-automatic and full automatic types. The company controls rights to patents on the well-known Automanual system, as well as an option to purchase license on the large groups of Western Electric automatic and semi-automatic patents.

The factory of the North Company at Galion, Ohio, will be used. The officers of the reorganized company are Charles H. North, president; Frank R. McBerty, vice-president and chief engineer; Kempster B. Miller, general manager; George C. Steele, secretary, and D. J. Cable, counsel.

Revision of Safety Code

The present edition of the National Electrical Safety Code, designated as Circular No. 54 of the Bureau of Standards, has been exhausted and before reprinting, the text of the rules will be revised. This revision is now under way and the Bureau of Standards is anxious to secure from all interested parties comments and suggestions for change of or for additions to the present rules which will improve them. Changes to be adopted must be such as will reduce accident hazards and must be reasonable and practicable. They should be supported by citation of specific instances or other evidence when possible, and should be addressed to the Bureau of Standards, Washington, D. C.

A list of proposed changes to Part 3 of the Safety Code has already been prepared and copies have been sent to the committee of technical and utility associations, state commissions and others who have been cooperating with the bureau in the formulation and revision of the rules. Similar lists of proposals for the other parts of the Code are now being prepared.

In a recent contribution by Mr. Gondet, before the Société Française de Physique, allusion is made to the possible applications of the tikker employed in wireless telegraphy, the function of which is to produce interruptions of current of a frequency capable of producing a musical note. A tikker of this type, used in conjunction with a telephone, could often be employed in practice, instead of a galvanometer, as a convenient means of recording small continuous currents of the order of 1 microampere upwards.

In Sweden experience in regard to scarcity of copper has been generally similar to that of Germany, and early in the present year an order was made that copper must not be used for conductors exceeding 6 sq. mm. in section without a permit from the executive committee dealing with the matter. It is understood that zinc is recommended as the most suitable substitute, being found in considerable quantities in Sweden and comparatively well adapted to electrical requirements.

The Automatic in Honolulu

The accompanying photo shows the beautiful new home of the Kalihi exchange in Honolulu, a branch of the Mutual Telephone Company which operates extensive automatic equipment in Honolulu and the Hawaiian Islands.

The first girl-less equipment to be installed in the Islands was cut into service by the Mutual Telephone Company in 1910 at Honolulu with an initial capacity of 1,800 stations. Today this installation has grown to over 9,500 and additional equipment is in order which, when installed, will swell the total to well past 10,000.

Operating electrical apparatus of any description under the peculiar tropical conditions prevailing in Honolulu presented new and interesting developments, but it is worthy to note that automatic equipment successfully proved out under such conditions and not only rendered satisfactory service but proved very acceptable to the subscribers.

The splendid growth made by the Mutual company has been due to sound financing, judicious management and close adherence to the policy of "Service First," and has necessitated the opening of many branch exchanges in and near the "home exchange" at Honolulu.

One of the first of these branches was cut into service at Kiamuki (a section of Honolulu), early in 1916 with a capacity of 1,000 lines which has recently been increased to almost 2,000.

In 1917 it was decided to open another branch exchange in Kalihi (also Honolulu), and the same general style of architecture that marks all Mutual buildings was followed in preparing a home for the new equipment.

Surrounded by palm trees and with a background of tropical verdure, this exchange, besides having the advantages of being modern, fireproof and practical is certainly a credit to the progressive spirit of the Mutual company.

The original installation at Kalihi consisted of 1,000 lines of the latest type of automatic. During the past month Automatic Electric Company has received an order for 200 lines additional equipment, demonstrating that automatic service is finding favor with subscribers at this point as it has in other cities of Hawaii.

At the close of the eighth year of automatic operation, F. G. Hummel, general manager of the Mutual company, in his report to the board of directors, presented data showing that the Mutual company has established an enviable record. Not only has its business shown a steady increase, but the finances of the company are in splendid condition.

The equipment after eight years' service is in first class condition and there is no logical reason to suppose that it should not continue to render the same satisfactory service for another eight or ten years.

The New Kahili Automatic Exchange at Honolulu.

Kansas City Merger Near

A contract of merger betwen the Kansas City Home Telephone Company and the Bell Telephone Company has been drawn and now is in New York, where it is being gone over by officials of the Bell company, A. F. Adams, president of the Home company, said September 3. Final agreement between the two companies should be reached soon, Mr. Adams believed.

The proceedings in New York will not mark the final execution of the merger, however, Mr. Adams pointed out. The plan will next have to be taken up with Mayor Cowgill and the city council and the city's approval of the plan itself granted. Then it will go to the Missouri Public Service Commission and United States government officials for the same procedure.

Postmaster General Burleson, director general of telephone and telegraph systems, has approved the general intention of a merger, but the contract has not been presented to him.

The contract also will have to be passed upon by Attorney General Gregory as to possible violations of the Sherman Anti-Trust Law and other legal points. The decision of one official would have no connection with that of the other, who might bar the merger or hold it up until the plan were reconstructed satisfactorily, Mr. Adams said. However, little difficulty is expected in executing the merger, although it will take some time.

Interstate Report for May

A summary of revenues and expenses of sixty-one of the largest telephone companies for May, made public by the interstate commerce commission, shows a decrease in net operating income of $353,740, or 5.3 per cent, as compared with May, 1917. In the same month there was an increase in total operating revenues of $1,453,613. or 5.4 per cent over May of last year. A summary for April recently showed a substantial increase in net operating income over the same month last year.

For the five months ending May 30, net operating income decreased $1,586,520, or 4.6 per cent, as compared with the same period in 1917.

First Lieutenant Edward I. Pratt

Edward I. Pratt, advertising manager of the Kellogg Switchboard and Supply Company, unable to resist the call of Uncle Sam any longer, has accepted the commission of first lieutenant in the Signal Corps.

Mr. Pratt has been with the Kellogg Company since 1905, having charge of the advertising department since 1907. He started in the telephone game as trouble clerk in Kleinsteuber's department of the Milwaukee Telephone Company, and worked for Charlie Staff and William Green; he also worked in the drafting room of the right-of-way department. In those days F. J. Holmes was business manager, P. J. Weirich trouble chaser, and William Burns wire chief.

Lieutenant Pratt, U. S. Signal Corps.

In his work as advertising manager for the Kellogg Company he has visited, photographed and described in articles most of the large Independent telephone exchanges in this country. Mr. Pratt developed the Service Department of the Kellogg Company to aid in co-operating with telephone companies in their publicity work. He originated *Telephone Facts*, which is well known to all Independent telephone men.

Mr. Pratt is a strong believer in originality, which is a prominent feature in all his advertising work.

Previous to the war and for the last two years he has been in the National Guard, and as captain in Company I, Eleventh Illinois Infantry, he encouraged the study of signaling and the use of field sets. He attended the first Fort Sheridan Camp and has partaken in many military activities.

He applied for a commission in the Signal Corps last June, was examined in July, and received his commission September 12, when he was sent to the officers' training school at Fort Leavenworth, Kansas.

C. W. Nelson, who has been assistant to Mr. Pratt for the past three years, will have charge of Kellogg advertising in Mr. Pratt's absence.

Raises for Springfield, Mo., Operators

Telephone operators of the Southwestern Bell Telephone Company at Springfield, Mo., received a general increase in salaries averaging 13½ per cent effective September 1.

The raise is purely local, only Springfield operators being affected. The pay of operators varies in the different cities depending upon size of the exchange and the amount of business done. The increase will affect 120 operators here and will amount to $6,500 a year.

The increase is not a result of government operation, S. M. Hardaway, district traffic chief, said.

Brevities of the Business

The Activities of the Whole Telephone Field Told in Short Paragraphs

PERSONAL NOTES.

J. G. Davis, of Munfordsville, Ky., has assumed his duties as manager of the local exchange of the Cumberland Telephone and Telegraph Company at Mt. Sterling, Ky. Mr. Davis takes the place of Mr. McNish, who goes to Paducah to become district traffic chief.

W. B. Bartleson, local manager of the Bell Telephone Company of Pennsylvania at Honesdale for the past few months, has enlisted in the United States naval reserves and will leave shortly for Newport, R. I., where he expects to be stationed for the present. Mr. Bartleson will be succeeded by F. L. Richards, who at the present time is connected with the commercial department of the Bell Company at Hazleton. Mr. Richards entered the employ of the Bell Company in 1910 and has made an excellent record with the company and is well fitted for his new position.

J. C. Williams has filed suit in the Sixteenth district court against the People's Home Telephone Company at Denton, Texas, for damages in the sum of $10,000. He alleges that through the failure of his telephone to operate he was unable quickly to secure the services of a physician when his child was poisoned by potash, from which she died.

Earl F. Francis, who for several years has been manager of the Citizen's Telephone Company in Lancaster, Ohio, has resigned to accept the position of manager of the Portage County Telephone Company, with headquarters at Revenna, Ohio. Mr. Francis has been connected with the Ohio State Telephone Company service in Lancaster since December, 1914, and has made many warm friends by courteous treatment to his patrons and the public in general. Mr. Francis will be succeeded as manager by O. M. Peters, who has been acting as wire chief of this company for several years.

Frank A. Neff, local manager of the Bell Telephone Company of the territory including Sunbury, Northumberland and Milton, Pa., received a merited promotion and goes to Reading, where he will serve the corporation as manager of that district. Mr. Neff has been employed by the Bell Telephone Company for a period of eleven years, having started as salesman at Sunbury in September, 1907. Mr. Neff will be succeeded by S. Lowry Stroh, who is also an employe of the Bell Telephone Company of long standing, having began his labors as adjuster in 1911.

Miss Nell Wilkins, Nebraska Telephone Company employe at Fremont, who was given a leave of absence on full pay, to serve with the American telephone forces in France, has landed at a French port, according to word received by relatives. Miss Wilkins is the second Fremont girl to go to France for telephone service.

Marion Kennedy, the blind switchboard operator who has been in the employ of the Trowbridge Mutual Telephone Company at Shelbyville, Ill., for the last fourteen years, and who recently resigned, giving as his reason that the company failed to keep the lines in good condition, was induced to withdraw his resignation. The directors promised to repair and keep the lines in good condition. At the annual meeting of the stockholders and directors, Kennedy was re-elected by unan-

imous vote of the directors, in which the stockholders also joined as a testimonial of their appreciation of the work of Mr. Kennedy. William Hiatt and Frank Kendall were re-elected directors. John E. Watts was elected president and Peter McAndrew vice-president.

John B. Pierce, former general manager of the Independent Telephone Company at Syracuse, N. Y., has been appointed examiner in charge of the Syracuse district of the federal employment service. He has charge of Onondaga, Oswego, Madison, Cayuga and Seneca counties, and will be in direct charge of branch offices at Oswego and Auburn.

H. L. Schneider, traffic manager of the Cleveland Telephone Company at Cleveland, Ohio, has resigned to take a position with the Interlake Engineering Company, 812 Rockefeller building, which is working on submarine orders. He has also resigned as president of the Electrical League.

Frank Binckley, former general manager of the Hamilton Home Telephone Company at Hamilton, Ohio, and now superintendent of the Independent Telephone Company at Bellefontaine, has patriotically offered his services to the government for active duty in France. Some time ago Mr. Binckley, despite his fifty years of age, offered his services in the radio department of the military service, providing he would be sent to France immediately for active service. He has received word from Washington that he will report for service at Camp Custer, Battle Creek, Mich., after receiving a physical examination at Columbus. Mr. Binckley is especially fit for this branch of the service through his long experience in this line of work, and in securing his services the government is to be congratulated. Mrs. Binckley will probably go to Camp Custer until Mr. Binckley leaves for France, after which she will take up her residence in Hamilton to await his return.

Fred A. Smith, former traffic chief for the Pacific Telephone and Telegraph Company at San Francisco, Cal., has been commissioned a second lieutenant of field artillery at Camp Zachary Taylor, Ky., according to word received by his friends. Lieutenant Smith enlisted with the Olympic Club contingent in the Grizzlies and was recommended for the officers' training camp in June. He has been ordered to Camp Jackson, Columbia, S. C.

G. K. Haspel, for a number of years employed by the Pike County Telephone Company at Washington, Ind., has left for Iowa City, Iowa, where he will be an instructor in vocational training at the college there.

C. M. Allen, telephone engineer in the office of District Forester George H. Cecil, Portland, Ore., has devised an apparatus which makes possible the calling to the telephone of persons who may be a considerable distance away from the instrument. The equipment consists of an ordinary Klaxon horn operated by a combination of special relays adjusted so that a direct current is necessary to produce the loud-sounding alarm. The energy to operate the relays is furnished by a special magneto which delivers either direct or alternating current, thus making it possible to use the ordinary ringing signal or the loud sounding alarm at will. Six cells of dry batteries are connected to the horn.

Announcement was made by District Manager W. F. Bush, of the Bell Telephone Company of Pennsylvania, that John F. Stanton has been appointed local manager of the Pottsville sub-district and will enter upon his new duties at once. Mr. Stanton has held various positions of responsibility with the company which have fitted him to take up his new work as local manager at Pottsville. He began his telephone career at Scranton early in 1913 and was transferred to Reading in 1915, and through his excellent efficiency and good work he was appointed local manager at Chambersburg, April 16, 1917, where through his untiring efforts the business grew rapidly.

A. B. Scheffey, manager of the Bell Telephone Company at Pottstown, Pa., has been appointed by the government as a four-minute man, and is authorized as an agent of Uncle Sam to give patriotic speeches in support of the administration and its war program. Mr. Scheffey has been doing considerable speaking in the past six months in Pottstown and vicinity.

In the process of consolidating the local telephone companies, the Citizen's and the Bell, at Circleville, Ohio, E. W. Lutz succeeds H. M. Rounce as the new manager of the merged utilities.

At a meeting of the board of directors of the Mason County Mutual Telephone Company held in Maysville, Ky., T. F. Gaither, who has been secretary-treasurer of the company since C. N. Bolinger left Mason county, tendered his resignation, which was accepted by the board, and J. Ed Parker was chosen to succeed him. Mr. Parker will make the telephone company a splendid secretary, having long been a member of the company and understanding its affairs perfectly.

F. H. Bethell, first vice-president of the New York Telephone Company, who has accepted the chairmanship of the Membership Drive Committee of the New York State Woman's Land Army, has opened campaign headquarters in Suite 151 at the Hotel Biltmore, Forty-third street and Madison avenue, Manhattan. Mr. Bethell announced that the final preparations for the drive for 1,000,000 members are now well under way.

Telephone Topics has lost its editor. When Frederic E. Cox said goodby to his associates and went into the military service, he was the third man to leave the New England Telephone Company's publicity department within two months. He has put on the uniform of sergeant in the signal corps, and will report directly to Major Foster Veitenheimer, chief signal officer of the northeastern department. His duties are somewhat indeterminate just now, but it will probably be necessary for him to travel about the New England states in connection with the work of the department. Mr. Cox has been employed by the company since September, 1909, when he became an office boy in the adjustment department. Since that time he has worked in the contract, collection and adjustment departments. In April, 1917, he was transferred to the publicity department as editor of *Telephone Topics*.

L. P. Vickers, of St. Anthony, Idaho, has taken over the management of the Buhl telephone exchange. F. C. Todd, former manager, and his family left for Ogden, Utah. Mr. Vickers was manager of the telephone exchange at St. Anthony, and was transferred to Buhl, taking over the office on September 6.

E. Meehan, from Atlanta, Ga., has assumed charge as manager of the local office of the Bell Telephone Company at Tuscaloosa, Ala. He succeeds W. H. Whitenton, who came from Atlanta about two weeks ago to take up the duties laid down by Manager Frye.

Fred L. Francis, manager of the Citizen's Telephone Company of Greenville, Mich., died recently. He was formerly telephone manager at Portland.

Employes of the United Telephone Company at Bellefontaine, Ohio, called Manager Frank Binkley to the company's office one evening recently. The general manager responded willingly, supposing the call to pertain to some matter of urgent business. Upon his arrival, much to his surprise he found a large number assembled, and before he had hardly realized what had happened, he had been presented with a beautiful wrist watch for use in his service with the United States signal corps in which he has enlisted. Mr. Binkley was well nigh overcome by the generosity of the faithful friends who had done him so much honor, and after collecting himself responded in a fitting manner. Mr. Binkley expects to leave soon for Camp Custer, Battle Creek, Mich., to enter training.

The War Department authorizes the following: Under the reorganization of the general staff, Brig.-Gen. Hugh S. Johnson and Gerard Swope have been appointed assistants to Maj.-Gen. George W. Goethals, director of purchase, storage and traffic. The quartermaster general of the army is made director of purchase and storage, and will be responsible for and have authority over storage, distribution and issue within the United States of all supplies for the army. Col. William H. Rose, of the corps of engineers, is designated to act under him as director of purchase, while Col. F. B. Wells will act as director of storage, with L. M. Nicolson as his assistant.

Capt. Argus Hibbard, for eighteen years vice president and general manager of the Chicago Telephone Company, has been charged with the important mission of reorganizing the telephone system of the American Red Cross in France, according to an official announcement made by the Red Cross recently. So great has been the work of the Red Cross in France, it was explained, that it was found necessary to install a complete telephone system of its own.

The American's Creed

By William Tyler Page

I believe in the United States of America as a government of the people, by the people, for the people; whose just powers are derived from the consent of the governed; a democracy in a republic; a sovereign nation of many sovereign states; a perfect union, one and inseparable; established upon these principles of freedom, equality, justice and humanity for which American patriots sacrificed their lives and fortunes.

I therefore believe it is my duty to my country to love it; to support its constitution; to obey its laws; to respect its flag, and to defend it against all enemies.

NEWS FROM THE FIELD.

ALABAMA.

The local and long-distance telephone lines in Florence, Sheffield and Tuscumbia are to be built new, from the ground up, and material for this task of changing an

antiquated to the most improved of telephone systems already is being collected at Florence in large quantities.

ARIZONA.

The Mountain States Telephone Company at Phoenix presents petition to increase rates to $5 per month to meet increased cost of operation.

ARKANSAS.

The Straddle telephone line at Little Rock has made its connection with central. It has six subscribers.

CALIFORNIA.

A public inspection twice a month is planned by the Santa Barbara Telephone Company after it has secured the necessary cable to connect up its toll system at the former Pacific building with the old Home exchange. On two afternoons of each month President George B. Bush will set aside a couple of hours when the workings of the plant will be fully explained to visitors.

An increase in wages from $1.50 to $2.25 per day for beginners and from $2 to $4 per day for the experienced will be demanded by local telephone operators, employes of the Pacific Telephone and Telegraph Company at San Francisco, as a result of an executive meeting held recently. The demands will be presented to the company on October 1 and will become operative on January 1, 1918.

The Santa Barbara Telephone Company was granted an extension of its franchise in Santa Maria at a meeting of the city trustees recently. The franchise calls for an extension of time in the duration of the company's right to operate here in Santa Maria, and before presentation to the trustees was gone over thoroughly by City Attorney C. L. Preisker and approved by him. A number of changes in the present franchise were embodied in the new one, such as the granting to the city of the use of a number of additional telephones, and also a special signal system for the night police department. The franchise will be in force after the publication of the ordinance.

CANADA.

Windsor and the adjoining border cities will fight the application of the Bell Telephone Company of Canada, which has been filed with the Dominion railway board, asking permission to increase the rates to telephone users. Other cities of Ontario will co-operate with the border municipalities and the application will be discussed soon at Toronto. According to F. W. Dewar, manager of the Windsor branch of the Bell company's system, the increase is necessary to meet an increase in salaries to employes, which has been decided on by the company. Dewar said. All employes receiving less than $200 a month will be affected by the plan of the company to boost salaries. This will mean an additional annual financial burden of approximately $1,300,000.

COLORADO.

The Sand Hill Telephone Company, which was organized a few months ago by farmers south of Hugo, has connected its line with the Mountain States Telephone Company.

FLORIDA.

Direct telephone connection with the office of the chief of police at the shipyards, and the chief of police at Pensacola, has been established. City Electrician LeBaron has tested the installed instruments and pronounced the service satisfactory. A connection was also made with the city's central fire station, and the telephones are to be used on official and necessary business only. In case of trouble there, necessitating the presence of either police or fire department, the telephones, of course, will come in handy. The telephones are connected with large gongs, which make a racket when set to work from either station.

GEORGIA.

The Georgia Railroad Commission recently received petitions from the Consolidated Telephone Company, at Thomasville; the Atlanta Telephone Company and the Houston Telephone Company, at Perry, asking for approval of the installation charges recently ordered by Postmaster General Burleson. All such petitions are answered with a letter containing the decision of the commission in the first petition, that of the Southern Bell Telephone Company, in which the commission disapproved the installation charges, but approved a moving charge equal to the actual cost of labor and material.

Five telephone companies through the state recently filed petitions with the railroad commission to have telephone installation charges approved by the commission. They are as follows: Glenwood Telephone Company, of Glenwood; Hahira Telephone Company, of Hahira; Douglas Telephone Company, of Douglas; Roberta Telephone System, of Roberta; Union Telephone and Electric Light Company, of Junction City.

ILLINOIS.

The application of the Virden Home Telephone Company for an advance in rates for telephone service at Virden was heard by Examiner Hugh Hunter of the state utilities commission. The hearing was concluded and a ruling will be made soon.

The proposed rates of the Central Union Telephone Company of Decatur and Rockford were suspended by the Illinois Public Utilities Commission at Springfield until January 28 next. The Central Union Company at Decatur had asked for an increase in rates of from 20 to 25 per cent. This means that nothing more will be done on the case until January.

Mrs. F. H. Mason, wife of Lieut. F. H. Mason, district communication officer, pulled the switch which "cut in service" on the new eight-point switch board located in the new postoffice building and transferred the 500 lines from the old exchange in the administration building at Great Lakes. Four other positions are being added to the new board which will care for later growth of the station. The former chief operators, W. J. Luchest, Allen Dobner and John Houghton, who were the means of maintaining the prompt and efficient telephone service on the station during its remarkable growth, will be detailed to assist in the operation of the small switchboards on the station, and it is expected that a majority of the sailor operators will be released for overseas duty or to take up further training in the various schools. Ensign E. F. Potter, formerly in charge of the telephone section, was detached from the station August 17, and ordered to an eastern city for special duties in radio telephony. Chief Electrician D. L. McWhorter, formerly a traffic manager for the new Chicago Telephone Company, is now in charge of operation of the station telephone system.

A telegram from Springfield announces that the Central Union Telephone Company has made application for an increase in telephone rates for a number of cities and towns in central Illinois. The rates are asked to be increased as follows: Individual business telephones, raised to $30 per year; individual party telephones to $27 per year; two-party line, $18 per year; four-party line, $15 per year; ten-party business line, $24 per year; ten-party residence line, $18 per year.

City Controller Pike has received a check for $306,875 from the Chicago Telephone Company. This represents the city's share of 3 per cent of the gross receipts for the first half of this year.

The Chicago Telephone Company has announced an advance in pay for its operators and made concessions as to working hours. The new schedule as announced allows double pay for holidays on which the operators are employed and regular pay for those who take the day off. Time and a half will be paid for the first Sunday on which the operators work each month and double pay for all other Sundays. Girls are also permitted to leave their posts to rest when traffic is light. The new ruling is said to have been brought about by a shortage of operators, because the girls resented Saturday afternoon and Sunday employment.

The Central Union Telephone Company of Springfield and the Chenoa Telephone Company of Chenoa have filed application with the state utilities commission for approval of a contract for interchange of service at Chenoa.

The Illinois Telephone Company at Roodhouse is installing a 100-line switchboard addition at the local exchange and will employ an additional operator to take care of it. This will result in increased efficiency of the service. The new switchboard will be in operation in a week or so. The Illinois company now has 620 subscribers on the local exchange, an increase from 490 since the advent of the present local manager, C. M. Tucker.

INDIANA.

Officers for the new year in the Queen City and Shelby County Mutual Telephone Company have been elected. The new officers are: President, J. W. Killam; vice-president, J. R. Pauschert; secretary and manager, C. M. Fleming; treasurer, O. W. Walker; collector, E. M. Hopkins. These officers were elected at the directors' meeting which followed the meetings of the stockholders, where the reports of the various officers showed the company to be in excellent condition, although the lateness of material in arriving hinders the work, as does the scarcity of labor in installing needed cables. At the stockholders' meeting J. W. Killam and C. M. Fleming were named to succeed themselves and S. B. Carr was named to take the place made vacant by B. F. Stretch.

With the clerk of the circuit court the board of directors of the German Telephone Company at Craigville filed an application to change the name of the company to that of the Craigville Telephone Company. The complaint states that the directors at a meeting held Monday, September 9, decided upon the change. Several months ago the matter of changing the name was brought up before the directors. It is said that the name "German" is very displeasing to the people of the community and that they want to get away from anything that is characteristic of the Hun. At the time there was some dissension in regard to changing the name, but recently this dissension gave way to approval. Patrons objected to receiving a receipt for payment of telephone rental with the name "German" staring them in the face.

VIRGINIA.

An amendment for the Piedmont Telephone and Telegraph Company of Gas-

tonia increases the capital from $400,000 to $600,000. W. T. Gentry is the president, the plant being controlled by the Southern Bell Company.

WEST VIRGINIA.

The Frankford Telephone Company, operating in Greenbrier county as a mutual concern, has asked authority from the public service commission to discontinue all service to non-stockholders. The Peoples' United Telephone Company, operating in Lewis, Harrison, Doddridge, Barbour, Taylor, Upshur, Webster, Randolph, Wetzel, Tyler, Braxton and Gilmer counties has asked authority to increase its rates 50 to 100 per cent.

U. S. Employment Service Wants Technical Men

Below is a copy (one-third reduced) of the classification blank for technical men used by the director of engineering of the United States Employment Service. The blank was designed by G. H. Krom, chief of that department in Chicago. Mr. Krom points out that the war demands executives of a particular class, men with a training and experience that is different from that of peace times. The change of conditions has made it especially hard for professional men of various kinds and for business executives to find their places in war work. The problem is great and the Government by solving it will save the time of many men who have been more or less thrown out of their regular duties, or whose business has been stopped by the war. At present, the demand for executives in the war industries is principally for technical engineers who have had professional and business experience. This war has been frequently called a war of engineering and it is certainly a technical man's war. All the mechanisms of the battle field, the air and the water have to be originated, designed and constructed by the technical man. All the gases, chemicals and deadly compositions of the daily fight are prepared by the technical man. The transportation of the armies, their fortifications and protections are the work of the technical man. As a result the technical man is needed most. He is needed for all important operations. He is the leader and director. All others must follow his orders. At present, a careful study is being made as to the supply and demand of this class of help. Statistics are being compiled from the personal registration blanks and the survey which is being made through the War Industries Board. From returns received to date there is apparently no shortage except in two or three special classes. These are, in particular, chemical engineers and mechanical draftsmen and designers.

GOVERNMENT CLASSIFICATION BLANK FOR ENGINEERS.

EXPERIENCE									ENGINEERING						SALARY	
Place number of years' practice in proper spaces below.									Indicate by X your special classification						Give figures on monthly basis	
Consulting	Commercial	Designing, Detailing and Checking	Contracting	Construction—Supt or Foreman	Inspection, Testing and Analyzing	Operation, Valuation & Scientific Management	Surveying—Instrument Man	Drafting—Tracing	CIVIL	MECHANICAL	ELECTRICAL	MINING	CHEMICAL and CHEMIST	Architects, Salesmen and Teachers, give specials below	Salary Desired	Lowest Considered

CHECK YOUR EXPERIENCE ON SUB-CLASSIFICATIONS

I CIVIL ENGINEERING
1—Bridges
2—Buildings
3—Reinforced Concrete
4—Highways
5—Railways
6—Harbor Work
7—Dams and Reservoirs
8—Reclamation
9—Waterways
10—Municipal
11—Water Supply
12—Sanitation
13—Ship Building
14—Structural Steel

II MECHANICAL ENGINEERING
1—Ordnance
2—Bridge Machinery
3—Dredging Machinery
4—Hoisting & Conv. Mchy
5—Machine Shop Mchy
6—Refrigerating Mchy
7—Steel Mill Machinery
8—Textile Machinery
9—Light Automatic Mchy
10—Marine Engines
11—Automotive
12—Internal Comb. Engines
13—Aeronautics
14—Gas Mfng Equipment
15—Steam Plant Equipment
16—Heat., Vent. & Bldg. Eqpt.
17—Industrial Plants
18—Railway Rolling Stock
19—Tools

III ELECTRICAL ENGINEERING
1—Batteries, Ignition
2—Electric Railways
3—Industrial Elec. Appl.
4—Switchboards
5—Light and Power Plants
6—Control Equipment
7—Motors and Generators
8—Transformers
9—Overhead Construction
10—Radio and Wireless
11—Railway Signaling
12—Telephone
13—Telegraph
14—Testing Apparatus

IV MINING ENGINEERING
1—Assayer
2—Drilling Machinery
3—Metallurgist
4—Mill and Ore Dress Mchy
5—Mineralogist and Geolo.
6—Mine Survey
7—Mining Machinery
8—Coal
9—Open Pit
10—Ore Dressing Mills
11—Petroleum
12—Smelter and Equipment
13—Underground Mining

V CHEMICAL ENGINEERING
1—Chemical Plant Equipt.
2—Cement
3—Dye Stuff
4—Explosives
5—Fertilizer
6—Gas
7—Oils
8—Glass
9—Soap
10—Hide and Leather
11—Iron and Steel
12—Paint
13—Photographic Supplies
14—Water Purification
15—Sewerage Treatment
16—Wood By-Products and Preservatives

Specials_____

I {am / am not} engaged in war work and {will / will not} leave present location.

My age is_____and my draft classification is_____

Print name_____

Print address_____

PLEASE FILL OUT AND MAIL AT ONCE TO THE DIRECTOR OF ENGINEERING

WISCONSIN.

The Wisconsin Telephone Company at Green Bay, which has always been active in patriotic endeavors, has mailed to every telephone subscriber in the state of Wisconsin a postcard headed: "Talk for Victory September 1 to 7." This card requests every telephone subscriber in Wisconsin when called on the phone during Victory Week to make the usual salutation and then say, "Have you made your victory pledge?" This method of keeping prominently before the people the necessity of loaning money to the government by buying war savings stamps is expected to bring pledgers from many who might otherwise fail to remember that they had received a blank pledge card by mail. The card further says, "Do this for our boys over there. A small thing for you to do. A big thing if everybody does it." The desirability of being able to answer "Yes" to the telephone inquiry will lead to a great number of subscriptions being made early in the week. The earlier subscriptions are made, the earlier they may be classified by the county committee and be placed in the hands of the banks, postoffices and other sales agents from whom the subscribers wish to buy.

The Washington County Telephone Company at Hartford has employed Emil Klemp, of Hubertus, as manager to succeed Mr. Sarles. Mr. Klemp is still living at Hubertus, but expects to move to this town before winter.

WYOMING.

Harry O. Nelson, local manager of the Mountain States Telephone Company, is authority for the statement that the company will build a new line from Kemmerer to Big Piney in the immediate future. The telephone service between these two points has not been the best, owing to the fact that the equipment is old and in bad condition, and the company has decided to abandon the old line entirely, and to build a new line following the Big Piney road. Mr. Nelson says that the men will be put to work on the new line just as soon as material can be unloaded, and that the line will be finished this fall. The company will spare no expense or efforts to provide its patrons in this section with the best of service, and the new equipment will cost about $12,000 per mile, making the total cost of the installation approximately $80,000.

A new line of telephone from Douglas to Lusk has been completed.

J. G. O'Neil of Salt Lake City is in Kemmerer making plans for the construction of the new telephone line from this place to Big Piney. The line has been surveyed and it is understood that work will be begun with a large force of men in the very near future.

New telephone system at Newcastle opens up big new territory for telephone communication.

The Burlington is stringing two new wires along the telegraph line for a railroad telephone which will be installed in the depot in a few days. The line extends from Bridgeport to Guernsey. It will be used for train orders, releasing the wires for other purposes.

The squad of men who are engaged in the construction of the new telephone line from Kemmerer to Big Piney have moved their headquarters to the Justin Pomeroy ranch. The men, C. L. Rae, A. E. Mackay, Claude Warner and Harry O'Harra, are working between Kemmerer and the Pomeroy ranch, but nearer the latter place, and their new headquarters is nearer to their employment than is Kemmerer.